

Comparative Indicators of Education in the United States and Other G-8 Countries: 2006

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SUMMARY

Introduction

This report describes how the education system in the United States compares with education systems in the other Group of Eight (G-8) countries. The G-8 countries—Canada, France, Germany, Italy, Japan, the Russian Federation, the United Kingdom, and the United States—are among the world's most economically developed countries. *Comparative Indicators of Education in the United States and Other G-8 Countries: 2006* draws on the most current information about education from three primary sources: the Indicators of National Education Systems (INES) project, conducted by the Organization for Economic Cooperation and Development (OECD); the 2003 Program for International Student Assessment (PISA 2003), also conducted by the OECD; and the 2003 Trends in International Mathematics and Science Study (TIMSS 2003), conducted by the International Association for the Evaluation of Educational Achievement (IEA). Begun in 2002, the series is published on a biennial basis.

It should be noted that most of the indicators in this report do not contain data for the complete set of G-8 countries. For example, Canada, France, and Germany did not participate in TIMSS 2003; therefore, these countries do not appear in indicators using these data. The United Kingdom is not included in indicators using PISA 2003 data due to low response rates; and in indicators using data from TIMSS 2003, the United Kingdom is represented separately by two of its component jurisdictions, England and Scotland.

The main findings of this report are summarized below. These highlights are organized around the five major sections of the report—population and school enrollment; academic performance; context for learning; expenditure for education; and education returns: educational attainment and income.

Population and School Enrollment

Youth Population

In 2006, the population of 5- to 29-year-olds (roughly the population most likely to be enrolled in education) represented 34 percent of the total population in the United States. In the other G-8 countries, the corresponding percentages ranged from 26 percent in Italy to 34 percent in the Russian Federation. In the past 10 years, the United States had the highest growth among the G-8 countries in the population of 5- to 29-year-olds, which increased by 7 percent between 1996 and 2006 (indicator 1).

Enrollment in Formal Education

In 2004, all or almost all 3- and 4-year-old children were enrolled in preprimary or primary education in France and Italy. In the other G-8 countries, at least three-quarters of 3- and 4-year-olds were enrolled in preprimary or primary education, with the exception of the United States, with 53 percent. Compulsory education, on average, ends at age 18 in Germany; age 17 in the United States; age 16 in Canada, France, and the United Kingdom; and age 15 in Italy, Japan, and the Russian Federation (indicator 2).

Foreign Students in Postsecondary Education

Among the G-8 countries, the United States had the most foreign students (in absolute numbers) enrolled in higher education,¹ but foreign students made up a higher percentage of enrollment in higher education in the United Kingdom (16 percent) as well as in Germany, France, and Canada (11 percent each). The United States was one of the countries with the smallest percentages of foreign students (3 percent); the others were Japan (3 percent), Italy (2 percent), and the Russian Federation (1 percent) (indicator 3).

Academic Performance

Fourth-Grade Mathematics and Science Performance

On the TIMSS 2003 fourth-grade assessment, higher percentages of students in Japan than in the other G-8 countries reached each established international benchmark in mathematics (indicator 4). In the United States and Scotland, fourth-grade males scored higher, on average, than fourth-grade females in both mathematics and science. In Italy, males outperformed females only in mathematics, whereas in England, Japan, and the Russian Federation, there were no significant differences by sex in mathematics or science (indicator 5).

Performance in Mathematics Literacy Among 15-Year-Old Students

On the PISA 2003 assessment, about one-quarter of 15-year-old students in the United States scored at or below the lowest proficiency level on the combined mathematics literacy scale, a higher proportion of students than in Germany, France, Japan, and Canada (indicator 6). Fifteen-year-old students in the United States generally scored lower, on average, than their peers in the same four G-8 countries on each of the four mathematics literacy subscales: space and shape, change and relationships, quantity, and uncertainty (indicator 7).

¹Internationally, education levels are defined according to the International Standard Classification of Education (ISCED). As used in this report, "higher education" refers to ISCED levels 5A (academic higher education below the doctoral level), 5B (vocational higher education), and 6 (academic higher education at the doctoral level) (except where specific data exclusions are noted). For more information on the ISCED levels, see appendix A.

Although U.S. students were generally at an advantage in terms of socioeconomic status (SES) compared to their G-8 peers, low-SES 15-year-old students in the United States were outperformed by their peers in Germany, France, Japan, and Canada in mathematics literacy (indicator 8).

In all G-8 countries, 15-year-old students who spoke the language of assessment, other official languages, or other national dialects at home most of the time scored higher in mathematics literacy than did their peers who spoke another language at home most of the time (indicator 9).

Relationship Between Reading and Mathematics Achievement

In all G-8 countries in PISA 2003, 15-year-old students who scored low in either mathematics or reading tended to score lower than average in the other subject as well. In the majority of the G-8 countries and for both reading and mathematics literacy, average scores in one subject area were at least 100 points lower (i.e., at least one standard deviation lower) than the average score for that country among those students who scored at level 1 or below in the other subject area (indicator 10).

Context for Learning

Mathematics Learning

In 2003, formal classroom instructional time per week on mathematics learning as reported by 15-year-olds ranged from an average of 3.0 hours in Germany to 3.7 hours in Canada and the United States. The number of instructional weeks per year ranged from 33.5 in Italy to 39.7 in Germany; in the United States, the number of instructional weeks per year was 36.0 (indicator 11).

Class Size and Ratio of Students to Teaching Staff

At the primary education level in 2004, two countries had an average class size of less than 20 students—the Russian Federation (16 students) and Italy (18 students). Four countries had an average class size between 20 and 25 students—Germany, with 22 students; France and the United States, both with 23 students; and the United Kingdom, with 24 students. Japan had the largest

average class size in primary education, with 29 students. The U.S. student/teacher ratio at the primary level (15) was lower than the ratio in all but one of the other G-8 countries. At the secondary level, student/teacher ratios ranged from 10 in the Russian Federation to 16 in the United States (indicator 12).

Teacher Professional Development in Mathematics and Science

In 2003, about two-thirds of U.S. fourth-graders had teachers who reported participating in professional development pertaining to mathematics content in the previous 2 years. Teacher participation in this area was lower in Italy, Japan, and Scotland (ranging from 29 to 42 percent), but higher in England (76 percent) (indicator 13).

In England, Italy, and the United States, there was generally more reported participation in professional development in mathematics than in science. Across all four professional development activities examined, no G-8 country had more fourth-graders with teachers reporting professional development participation in science than in mathematics (indicator 13).

School Principals' Uses for Assessments

In 2003, a greater percentage of U.S. 15-year-old students than their peers in all other G-8 countries had principals who reported using assessment results to compare their school's performance to district- or national-level performance. This frequency ranged from about 2 out of 10 students in Japan and Germany, 3 out of 10 students in Italy, and 7 out of 10 students in the Russian Federation and Canada to 9 out of 10 students in the United States. Similarly, a greater percentage of U.S. students than their peers in four other G-8 countries had principals who reported using assessment results to compare their school with other schools (80 percent in the United States vs. 53 percent in Canada, 29 percent in Italy, 17 percent in Germany, and 12 percent in Japan). Assessment results were also more likely to be used in the United States than in the same four G-8 countries to monitor schools' progress from year to year (93 percent in the United States compared to a range from 44 to 79 percent). In the United States, the assessment purpose least frequently cited was making judgments about teachers' effectiveness (55 percent) (indicator 14).

Expenditure for Education

Public School Teachers' Salaries

In 2004, the United States paid the second highest average starting salary to public school teachers at both the primary and upper secondary education levels with minimum training (roughly \$32,000). For public school teachers with minimum training plus 15 years of experience, average salaries were higher in England, Scotland, Japan, and Germany than in the United States at both education levels. In most G-8 countries, public school teachers at both education levels with minimum training earned less than the average gross domestic product (GDP) per capita in their respective countries. On the other hand, in all G-8 countries, public school teachers at both education levels with minimum training plus 15 years of experience earned at least as much as the average GDP per capita in their respective countries (indicator 15).

Expenditure for Education

All of the G-8 countries in 2003 spent more money per student at the higher education level than at the combined primary and secondary education levels; however, more money in total was spent at the combined primary and secondary education levels than at the higher education level, where student enrollment is much lower. The United States spent \$24,074 per student at the higher education level and \$8,943 per student at the combined primary and secondary education levels, with both amounts higher than the corresponding figures in all other G-8 countries. In total dollars as a percentage of GDP, the United States spent 2.9 percent of its GDP on higher education and 4.1 percent of its GDP on primary and secondary education. Considering education expenditure at all levels combined, the United States spent a higher percentage of its GDP on education (7 percent) than did any of the other G-8 countries (indicator 16).

Education Returns: Educational Attainment and Income

In 2004, the Russian Federation had the largest percentage of adults ages 25 to 64 who had completed higher education (55 percent), followed by Canada (45 percent); Italy had the smallest percentage (11 percent).² In the United States, 39 percent of adults ages 25 to 64 had completed higher education. Among 25- to 34-year-olds, 36 percent of U.S. males and 42 percent of U.S. females had completed higher education (indicator 17). In all of the G-8 countries except Germany, a greater percentage of first university degrees³ were awarded in the combined field of social sciences, business, and law than in any other field, with the highest percentage awarded in the United States. In contrast, in science, mathematics, and engineering-related fields, the United States awarded the lowest percentage of first university degrees of all the G-8 countries (indicator 18).

In the United States and all other G-8 countries, higher employment rates were associated with higher levels of educational attainment. For example, among U.S. adults ages 25 to 64 in 2004, 83 percent of those who had completed academic higher education were employed, compared with 73 percent of those whose highest educational attainment was upper secondary education or postsecondary vocational training and 57 percent of those whose highest educational attainment was lower secondary education or below (indicator 19). Eighty-three percent of U.S. adults ages 25 to 64 whose highest educational attainment was at the lower secondary level or below earned at or below the median income of U.S. adults in 2004, while 69 percent who attained at least a first university degree earned above the median income (indicator 20).

²In the Russian Federation, the reference year is 2003 rather than 2004.

³Programs that prepare students for advanced research and highly qualified professions are classified as first university degree programs. First university degree programs vary in duration in different countries in different programs of study. In the United States, the first university degree corresponds to a bachelor's degree; it excludes associate's degrees.

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Introduction

INTRODUCTION

With the emergence and growth of the global economy, many have turned to international comparisons to assess how well national systems of education are performing. These comparisons shed light on a host of issues, from access to education to equity of the resources devoted to educational achievement. They provide the opportunity to compare different aspects of countries' education systems, assess these systems' performance, and identify potential strategies to improve student achievement and system outputs.

Since the 1960s, the United States has participated actively in international projects that are designed to provide key information about the performance of the U.S. education system relative to education systems in other countries. These projects include the Indicators of National Education Systems (INES) at the Organization for Economic Cooperation and Development (OECD); the Trends in International Mathematics and Science Study (TIMSS) and the Progress in International Reading Literacy Study (PIRLS), both conducted by the International Association for the Evaluation of Educational Achievement (IEA); and OECD's Program for International Student Assessment (PISA). This report, *Comparative Indicators of Education in the United States and Other G-8 Countries: 2006*, draws on the most current information available from most of these projects at the time the report was being produced (in the summer and fall of 2006) to present a set of education indicators that describes how the U.S. education system compares with those in other economically developed countries.¹ Updated information from these various projects will be incorporated in subsequent reports.

Although the international education projects cited above involve many countries worldwide, the comparisons in this report focus on the Group of Eight (G-8) countries: Canada, France, Germany, Italy, Japan, the Russian Federation, the United Kingdom, and the United States. These are among the most industrialized countries in the world. The G-8 countries were selected as a comparison group because of the similarities in their economic development and because the other G-8 countries are among the major economic competitors of the United States. The leaders of these countries meet regularly to discuss economic and other policy issues.

What's New in 2006?

Whereas the previous *Comparative Indicators* reports (in 2004 and 2002) were organized largely around levels of education, the current report is organized by topic around the following sections—population and school enrollment; academic performance; context for learning; expenditure for education; and education returns: educational attainment and income. The indicators in this report were prepared using new results from three main sources: PISA 2003, TIMSS 2003, and new data compiled by OECD and reported in the 2006 edition of *Education at a Glance*. Findings from PISA 2003, an

assessment of 15-year-old students, were used to create new indicators on topics such as mathematics achievement and language spoken at home, mathematics achievement and socioeconomic status, time spent on mathematics learning, student perception of teacher support in mathematics lessons, the relationship between reading and mathematics achievement, and school principals' reports of the purposes of assessment. Findings from TIMSS 2003 were used to create new indicators pertaining to fourth-graders in mathematics and science—their overall academic performance based on established international benchmarks, differences by sex in their academic achievement, and reports by their teachers about their professional development in these subject areas. The 2006 edition of *Education at a Glance* was used not only to update many existing indicators, but also to develop several new indicators. These new indicators cover class size and the ratio of students to teaching staff, expenditure in education institutions by service category, educational attainment in the adult population, and the distribution of the population by education and income.

Education Levels Used for the Indicators

Many of the indicators in this report refer to at least one of the following education levels: preprimary education, primary education, secondary education, and higher education. A brief overview of the education levels is presented here to provide the reader with a frame of reference while reading the indicators (see appendix A for a more detailed description). To ensure comparability in the indicators across countries, each country restructured its national education data to correspond with the definitions of education levels that were developed in the 1997 revision of the International Standard Classification of Education (ISCED) (United Nations Educational, Scientific and Cultural Organization 1997). The following descriptions highlight the key features of (1) education programs from preprimary through secondary education and (2) higher education programs.

Preprimary education includes programs of education for children at least 3 years of age that involve organized, center-based instructional activities; in most countries, preprimary education is not compulsory. Primary education includes programs that are designed to give students a sound basic education in reading, writing, and mathematics, along with an elementary understanding of other subjects, such as history, geography, science, art, and music. In the international classification, primary education usually begins at the start of compulsory education (around age 6) and lasts for 6 years. Secondary education encompasses two stages: lower secondary education and upper secondary education. Lower secondary education includes programs that are designed to complete basic education; the standard duration in the international classification is 3 years. Upper secondary education is designed to

¹Data from the 2001 administration of PIRLS were used extensively in the 2004 edition of this report (see <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2005021>). PIRLS was again administered in 2006, and these data will be used in the 2008 edition of this report.

provide students with more in-depth knowledge of academic or vocational subjects and to prepare them for higher level academic or vocational studies or entry into the labor market. The standard duration of upper secondary education in the international classification is 3 years.

Higher education includes tertiary programs² that fall into three main categories:

- *Academic higher education below the doctoral level.* These programs are intended to provide sufficient qualifications to gain entry into advanced research programs and professions with high skill requirements. The international classification includes programs of medium length that last less than 5 years and long programs that last 5 to 7 years. In the United States, bachelor's, master's, and first professional degree programs are classified at this level.
- *Vocational higher education.* These programs provide a higher level of career and technical education and are designed to prepare students for the labor market. In the international classification, these programs last 2 to 4 years.
- *Doctoral level of academic higher education.* These programs usually require the completion of a research thesis or dissertation.

The international classification also includes an education level that straddles the boundary between secondary and higher education: postsecondary nontertiary education. This program of study—which is primarily vocational in nature—is generally taken after the completion of secondary school, but the subject content is not more advanced than the content of secondary school courses. In the United States, these programs are often in the form of occupationally specific vocational certificate programs, such as 1-year certification programs offered at community colleges.³

Mapping G-8 Countries' Education Systems to the ISCED

Differences in the structure of countries' education systems often make international comparisons difficult. To improve the comparability of education indicators, OECD and UNESCO worked with countries to standardize their education systems with the ISCED, as described above. Using ISCED classifications as a starting point, the National Center for Education Statistics (NCES) worked with education professionals in other G-8 countries to create a general overview of each country's education system. As an aid to the reader, schematics of how the ISCED applies to each of the G-8 countries are provided in appendix A, accompanied by text describing each system in greater detail.

Organization of the Report

The report begins with a summary section that highlights key findings; it then presents 20 indicators that compare different aspects of the education system in the United States to education systems in other G-8 countries. The indicators are organized into the following sections:

- population and school enrollment;
- academic performance;
- context for learning;
- expenditure for education; and
- education returns: educational attainment and income.

The first section, *population and school enrollment*, presents indicators that suggest the potential demand for education in countries as measured by the size and growth of their youth population and current levels of enrollment in formal education. The section concludes with an indicator that examines the extent to which foreign students are enrolled in higher education across the G-8 countries.

The next section, *academic performance*, presents indicators on student achievement in mathematics and science in the G-8 countries, including achievement differences across key demographic variables such as sex, socioeconomic status (SES), and language spoken at home. This section also presents an analysis of the relationship between mathematics and reading achievement.

The third section highlights a range of key policy-relevant issues pertaining to the *context for learning*, including instructional time, class size and the ratio of students to teaching staff, and teacher professional development in mathematics and science. This section also presents a cross-national look at the purposes of assessment as reported by school principals.

The fourth section provides a comparative look at *expenditure for education*, including breakdowns by expenditure as a percentage of a country's gross domestic product (GDP) and an indicator on public school teacher salaries in primary and secondary education.

The final section, *education returns: educational attainment and income*, focuses on educational attainment, employment rates, and earnings (including breakdowns by sex and field of study).

Each indicator is presented in a two-page format. The first page presents key findings that highlight how the United States compares with its G-8 peers (with data available) on the indicator. The key findings are followed by a short section that defines the indicator and describes key features of the methodology used to produce it. The second page presents graphical depictions of the data that support the key findings. These tables and/or figures also include the specific data source for the indicator and more detailed notes on interpreting the data.

²In the international classification, more advanced postsecondary education (such as attending a 4-year college or university) is referred to as tertiary education. In the current report, the term "higher education" is used because this term is more familiar to American readers.

³In data showing the ratio of students to teaching staff (indicator 12) and annual education expenditure (indicator 16), postsecondary nontertiary education data are included under secondary education and/or higher education for one or more countries as specified in the figures. In data showing the percentage distribution of the population by highest level of education completed (indicator 17), employment rates (indicator 19), and the distribution of the population by education and income (indicator 20), all of the G-8 countries reporting data show a combined category that includes upper secondary education and postsecondary nontertiary programs.

Data Sources

There are three main sources of data for this report:

- *INES data.* Data from the INES project come from tables in *Education at a Glance: OECD Indicators 2006* or from OECD's online Education Database. These data are derived from annual data collections carried out by OECD, with member countries' data coming from a variety of national data sources, including administrative data collections, school surveys, household surveys, and national financial reports. Most of the indicator data for the United States come from the Current Population Survey (CPS) of the U.S. Census Bureau, the NCES Common Core of Data (CCD), the NCES Integrated Postsecondary Education Data System (IPEDS), and the NCES Schools and Staffing Survey (SASS).
- *PISA 2003 data.* PISA is conducted by the OECD and is an assessment of 15-year-old students, with a major focus in 2003 on mathematics literacy.
- *TIMSS 2003 data.* TIMSS is conducted by the IEA. Due to the availability of fourth-grade data from a larger number of G-8 countries in TIMSS 2003, this report uses data from the fourth-grade assessments in mathematics and science, rather than eighth-grade data.

Data for indicator 1, on youth population, are from the International Data Base (IDB) of the U.S. Census Bureau.

When interpreting the data presented in this report, it is important for readers to be aware of limitations based on the source of information and problems that may exist in verifying comparability in reporting. Throughout this report, the unit of analysis is often the student. For example, many of the indicators show the mean scores of students (e.g., indicators 5 and 7) or the percentage of students along a particular characteristic (e.g., indicators 4 and 9). Other indicators also use the student as the unit of analysis, but report data from other sources. For example, using data from PISA 2003, indicator 14 shows the percentage of students whose principals reported that they used assessment results for various purposes. Using data from TIMSS 2003, indicator 13 shows the percentage of students whose teachers reported participating in various professional development activities. In several other indicators, the unit of analysis is not the student. For example, in indicator 15, the unit of analysis is the teacher (i.e., teacher salaries), and in indicator 18, the unit of analysis is postsecondary degrees. Except for indicator 15, which explicitly states that the data pertain to public school teachers only, the indicators in this report include data from both public and private schools.

Availability of Country Data

It should be noted that most of the indicators in this report do not contain data for the complete set of G-8 countries. That is, specific countries are sometimes not included or are only partially included in an indicator. This is often the result of source data not being available or specific countries not participating in a particular survey. For example, Canada, France, and Germany did not participate in TIMSS 2003; therefore, these countries do not

appear in indicators using these data. The United Kingdom deserves special mention. In indicators from *Education at a Glance: OECD Indicators 2006*, the United Kingdom includes England, Northern Ireland, Scotland, and Wales. In indicators using data from TIMSS 2003, the United Kingdom is represented separately by two of its component jurisdictions, England and Scotland. While every effort was made to use the most up-to-date data available across the G-8 countries (usually from 2003 or 2004), data from an earlier year, such as 2002, were sometimes used if more recent data were not available. To make this clear to the reader, these occurrences are noted in relevant tables and figures.

Sampling and Response Rates

In sample surveys like PISA and TIMSS, participating countries were expected to make great efforts to secure the participation of sampled schools and students. However, 100 percent participation at the school and student levels, and across items, is often not attainable.

In anticipation of the fact that school participation falls short of 100 percent in many countries and, thus, to avoid sample size losses resulting from this, a mechanism was instituted to identify, a priori, replacement schools for each sampled school. For each sampled school, the next school on the ordered school sampling frame was identified as its replacement, and the one after that as a second replacement, should it be needed. The use of implicit stratification variables and the subsequent ordering of the school sampling frame by size ensured that any sampled school's replacement would have similar characteristics. Although this approach does not guarantee avoiding response bias, it may reduce the potential for bias, and was deemed more acceptable than over-sampling to accommodate a low response rate. Consistent with what has been done in TIMSS 2003 reports published by IEA, TIMSS 2003 participating countries that met sample participation rates only after including replacement schools have been footnoted in the tables and figures of this report.

In order that PISA and TIMSS can ensure reliable and internationally comparable data, participating countries agree ahead of time on a process for the validation of all national data submissions. As the basis for this process, PISA and TIMSS have established technical standards for the quality of datasets which countries must meet in order to be included in the comparative results. These standards are described in detail in the technical reports (Martin, Mullis, and Chrostowski 2004; OECD 2005). In the case of the United Kingdom in PISA 2003, OECD (2004) reported that the uncertainties surrounding the sample and its bias are such that its scores cannot reliably be compared with those of other countries. Thus, in the indicators in this report using data from PISA 2003, it is noted that the United Kingdom is not included due to low response rates.

Consistent with NCES statistical standards, item response rates less than 85 percent are footnoted in the tables and figures of this report, as well as instances where reporting standards are not met because of too few observations to provide reliable estimates.

Statistical Testing

About half of the indicators presented in this report are derived either from administrative records that are based on universe collections or from national sample surveys for which standard errors were not available. Consequently, for these indicators, no tests of statistical significance were conducted to establish whether observed differences from the U.S. average were statistically significant. However, for the 10 indicators derived from PISA or TIMSS data (indicators 4 through 11, 13, and 14), student's *t* statistics were calculated for comparisons of estimates within or between countries (e.g., to test whether a U.S. estimate is statistically different from other G-8 countries' estimates). Differences were reported if they were found to be statistically significant at the .05 level, using two-tailed tests of significance.

Other International Indicator Publications

Prior to this report, NCES produced two earlier reports, in 2004 and 2002, describing how education in the United States compares with education in the other G-8 countries. The 2004 report can be found at <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2005021>. The 2002 report can be found at <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2003026>. General information about the International Activities Program at NCES, including work on international comparisons in education, can be found at <http://nces.ed.gov/surveys/international>.

A photograph of four diverse middle school students smiling in a school hallway. The students are of various ethnicities and are holding books and papers. The background shows rows of school lockers. The entire image has a light green tint.

INDICATORS PART I

Population and School Enrollment

YOUTH POPULATION

Key Findings: Canada, France, Germany, Italy, Japan, Russian Federation, United Kingdom, United States

The United States had the highest growth among the G-8 countries in the population of 5- to 29-year-olds, which increased by 7 percent between 1996 and 2006.

In 2006, the total population across the G-8 countries ranged from 33.1 million in Canada to 298.4 million in the United States, and the population of 5- to 29-year-olds (roughly the population most likely to be enrolled in education) ranged from 10.6 million in Canada to 102.9 million in the United States (table 1). The population of 5- to 29-year-olds represented 34 percent of the total population in the United States (table 2). In the other G-8 countries, the corresponding percentages ranged from 26 percent in Italy to 34 percent in the Russian Federation.

Focusing on the subpopulation of 5- to 19-year-olds (which generally includes individuals of primary- and secondary-school age) reveals that this age group represented 21 percent of the total population in the United States in 2006. The U.S. percentage was higher than the percentages in all of the other G-8 countries, which ranged from 14 percent in Italy to 19 percent in Canada and the United Kingdom.

Considering the high end of the age range, the subpopulation of 20- to 29-year-olds (which generally includes individuals of postsecondary education age) represented 14 percent of the total population in the United States in 2006, falling below the percent-

age in the Russian Federation (16 percent). The percentages in the other G-8 countries were slightly lower than in the United States, ranging from 11 percent in Germany and Italy to 13 percent in Canada, France, and the United Kingdom.

Between 1996 and 2006, the United States had the highest growth in the population of 5- to 29-year-olds (7 percent) (figure 1). Among the other G-8 countries, only Canada experienced growth over this period (3 percent). The population of 5- to 29-year-olds declined in all of the other G-8 countries, with decreases ranging from 2 percent in the United Kingdom to 18 percent in Italy.

Consistent with the results for the broader youth population, the United States had the highest growth in the subpopulation of 5- to 19-year-olds, which increased by 6 percent between 1996 and 2006. There were also increases in Canada and the United Kingdom (3 percent and 2 percent, respectively). All of the other G-8 countries experienced a decline over this period, with the largest in the Russian Federation (27 percent).

With respect to the high end of the age range, the United States had the second highest growth in the subpopulation of 20- to 29-year-olds, which increased by 9 percent between 1996 and 2006. With the exception of increases in the Russian Federation and Canada (14 percent and 4 percent, respectively), the other G-8 countries experienced a decline over this period, ranging from 7 percent in the United Kingdom to 27 percent in Italy.

Definitions and Methodology

In each country, the percentage of the population of 5- to 29-year-olds in 1996 and 2006 is calculated by dividing the population of 5- to 29-year-olds by the total population. The percentage change in the population of 5- to 29-year-olds is calculated by subtracting the population of 5- to 29-year-olds in 1996 from this population in 2006 and dividing by the 1996 population of 5- to 29-year-olds.

These calculations are applied in the same way to the age groups 5 to 19 and 20 to 29. The age group (e.g., 5 to 29) as a percentage of the total population may have declined from 1996 to 2006 even though the size of the age group may have increased. This is due to a higher rate of increase of the total population compared to the rate of increase for the specific population age group.

Table 1. Population aged 5 to 29, 5 to 19, and 20 to 29, by country: 1996 and 2006
(in millions)

Age group and year	Canada	France	Germany	Italy	Japan	Russian Federation	United Kingdom ¹	United States
Total population (all ages)								
1996	30.0	58.4	81.9	57.4	125.6	148.3	58.6	269.7
2006	33.1	60.9	82.4	58.1	127.5	142.1	60.6	298.4
Population aged 5 to 29								
1996	10.3	20.0	24.8	18.2	41.2	54.4	19.4	96.1
2006	10.6	18.9	22.4	14.8	34.1	47.8	19.1	102.9
Population aged 5 to 19								
1996	6.0	11.5	13.6	9.1	22.1	34.4	11.1	58.2
2006	6.2	11.2	12.9	8.2	18.5	25.0	11.3	61.6
Population aged 20 to 29								
1996	4.2	8.5	11.2	9.1	19.2	20.0	8.3	37.9
2006	4.4	7.7	9.5	6.6	15.6	22.9	7.8	41.3

¹The United Kingdom includes England, Northern Ireland, Scotland, and Wales.

SOURCE: U.S. Department of Commerce, U.S. Census Bureau. (2006). International Data Base (IDB), Table 94: Midyear Population, by Age and Sex, 1996 and 2006.

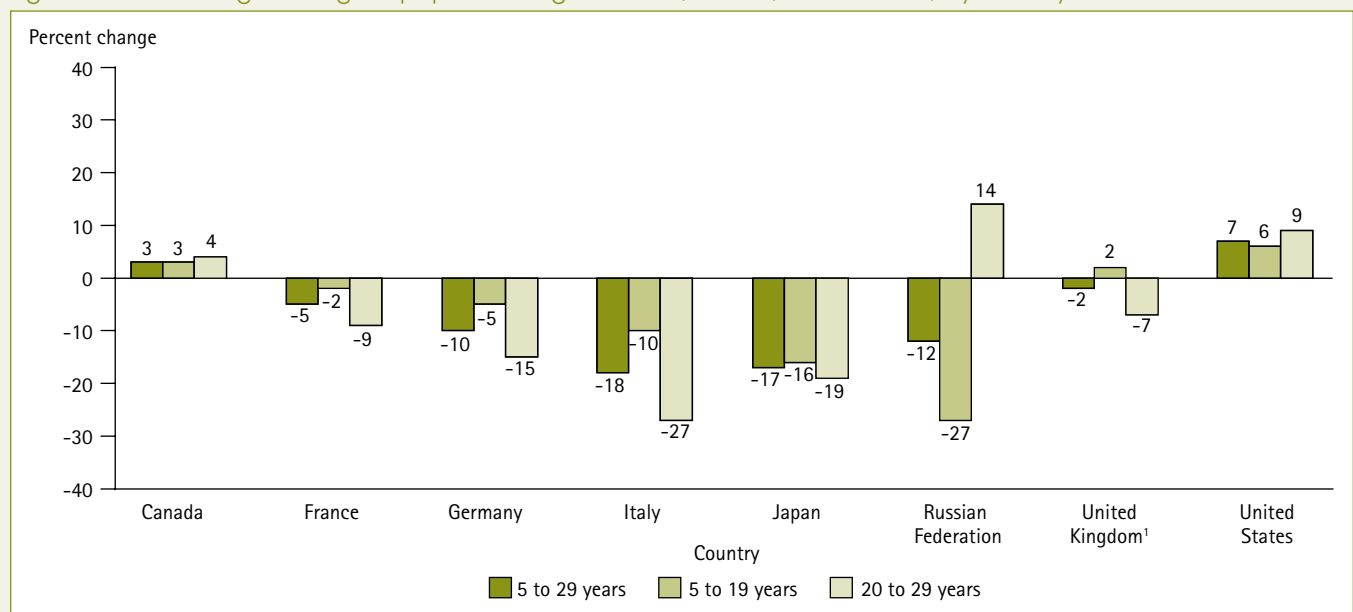
Table 2. Percentage of population aged 5 to 29, 5 to 19, and 20 to 29, by country: 1996 and 2006

Age group and year	Canada	France	Germany	Italy	Japan	Russian Federation	United Kingdom ¹	United States
Population aged 5 to 29								
1996	34.3	34.2	30.3	31.7	32.8	36.7	33.2	35.7
2006	32.1	31.1	27.2	25.5	26.7	33.7	31.4	34.5
Population aged 5 to 19								
1996	20.1	19.7	16.6	15.9	17.6	23.2	18.9	21.6
2006	18.8	18.4	15.7	14.1	14.5	17.6	18.6	20.7
Population aged 20 to 29								
1996	14.1	14.5	13.7	15.8	15.2	13.5	14.2	14.1
2006	13.3	12.7	11.5	11.4	12.2	16.1	12.8	13.8

¹The United Kingdom includes England, Northern Ireland, Scotland, and Wales.

SOURCE: U.S. Department of Commerce, U.S. Census Bureau. (2006). International Data Base (IDB), Table 94: Midyear Population, by Age and Sex, 1996 and 2006.

Figure 1. Percentage change in population aged 5 to 29, 5 to 19, and 20 to 29, by country: 1996 to 2006



¹The United Kingdom includes England, Northern Ireland, Scotland, and Wales.

SOURCE: U.S. Department of Commerce, U.S. Census Bureau. (2006). International Data Base (IDB), Table 94: Midyear Population, by Age and Sex, 1996 and 2006.

ENROLLMENT IN FORMAL EDUCATION

Key Findings: Canada, France, Germany, Italy, Japan, Russian Federation, United Kingdom, United States

All or almost all 3- and 4-year-old children were enrolled in preprimary or primary education in France and Italy. In the other G-8 countries, at least three-quarters of 3- and 4-year-olds were enrolled, with the exception of the United States, with 53 percent.

In 2004, all or almost all 3- and 4-year-old children were enrolled in preprimary or primary education programs in France and Italy (table 3). In the other G-8 countries reporting data, at least three-quarters of 3- and 4-year-olds were enrolled in preprimary or primary education programs, with the exception of the United States, with 53 percent. Beginning at age 6 in Germany and the United States, and at age 7 in the Russian Federation, at least 90 percent of the population was enrolled in formal education (figure 2).

In 2004, the United States and the other G-8 countries had close to universal school participation of children ages 5–14—the age range that typically corresponds with primary and lower secondary education (table 3). In the Russian Federation, 90 percent of 5- to 14-year-olds were enrolled in formal education programs, with all other G-8 countries at 97 percent participation or higher.

The United States had an enrollment rate of 76 percent in 2004 for youth ages 15–19—the age range that corresponds most closely with upper secondary education. The enrollment rates for this age group were 79 percent in Italy and the United Kingdom. In France and Germany, the enrollment rates were 87 and 89 percent, respectively.

Compulsory education, on average, ends at age 18 in Germany; age 17 in the United States; age 16 in Canada, France, and the United Kingdom; and age 15 in Italy, Japan, and the Russian Federation (figure 2). Participation in formal education tends to be high until the end or close to the end of compulsory education. In France and Japan, over 90 percent of the population was enrolled in formal education beyond the ending age of compulsory education.

Enrollment rates for 20- to 29-year olds—the age range that corresponds most closely to the typical age of enrollment in higher education—were less than 30 percent among the five G-8 countries reporting data (table 3). The United States had an enrollment rate of 23 percent for this age range. The U.S. rate was lower than the rates in Germany and the United Kingdom (both at 28 percent), but higher than the rates in France (21 percent) and Italy (19 percent).

Definitions and Methodology

The percentage of the population at given ages enrolled in education is called an “enrollment rate.” In this indicator, the term “enrollment rate” refers to the “net enrollment rate” and is defined as the number of students in a particular age group enrolled in education divided by the population of that same age group.

The reference year is 2004 for population and enrollment data in all countries; however, reference dates within the year may differ. Thus, enrollment rates may exceed 100 percent for some countries and some age categories largely due to different reference dates for school enrollment and population data.

Enrollments include all full-time and part-time students in public and private institutions. Enrollment in preprimary education programs (generally the 3- to 4-year-old age group) includes only children in center-based programs and excludes children in home-based early childhood education.

The ending age of compulsory education is the age at which individuals are no longer required to participate in formal education.

Table 3. Percentage of population aged 3 to 29 enrolled in formal education, by age group and country: 2004

Country	Students participating in formal education			
	3- to 4-year-olds ¹	5- to 14-year-olds	15- to 19-year-olds	20- to 29-year-olds
France ²	116.3	101.6	87.1	20.8
Germany	76.9	97.9	88.8	27.9
Italy ²	104.9	101.6	78.8	19.4
Japan	81.4	100.7	—	—
Russian Federation	—	90.4	—	—
United Kingdom ³	76.7	100.4	79.0	27.8
United States	52.9	97.3	76.5	23.4

—Not available.

¹Data show students age 4 and under as a percentage of the population of 3- to 4-year-olds.

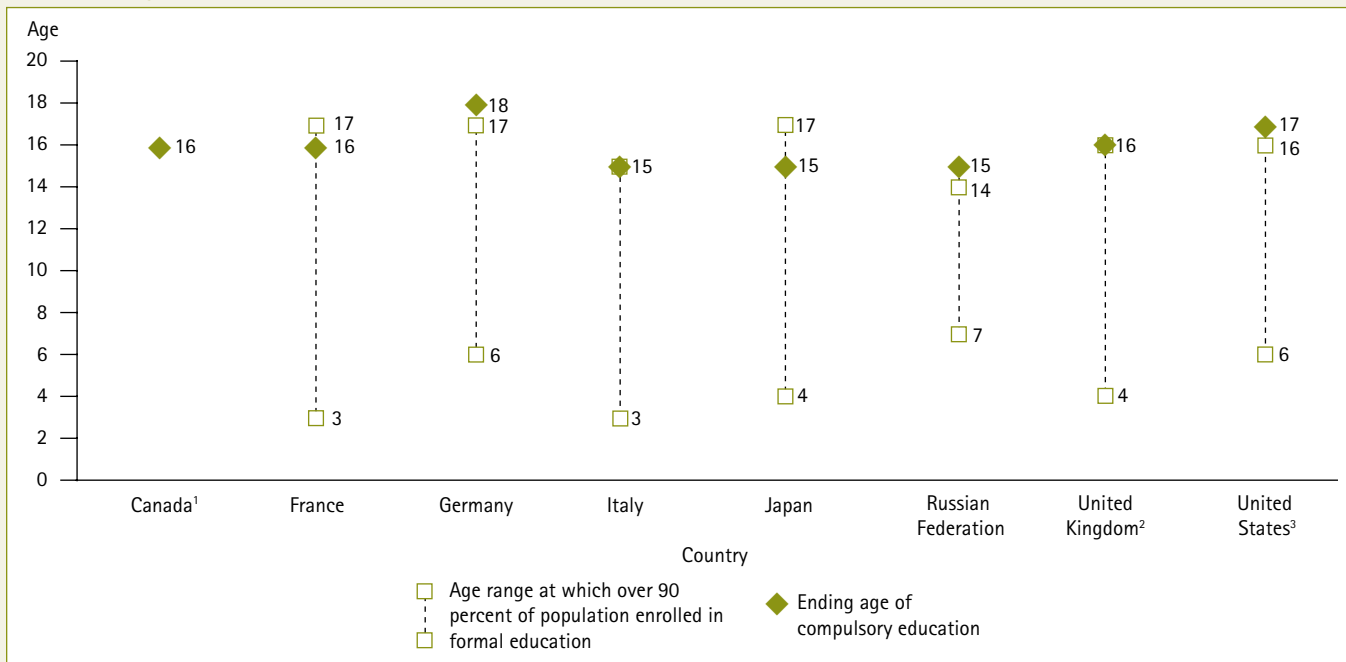
²The percentage of 3- to 4-year-olds enrolled in formal education is overestimated, as there are a significant number of enrolled students under the age of 3. The percentage of 3- to 4-year-olds enrolled in formal education is around 100 percent.

³The United Kingdom includes England, Northern Ireland, Scotland, and Wales.

NOTE: Reference year is 2004 for population and enrollment data in all countries; however, reference dates may differ within that year. Enrollment rates for some countries exceed 100 percent in one or more age ranges due to different reference dates for school enrollment and population data. Enrollment in formal education at the preprimary education level includes children in center-based programs and excludes children in home-based early childhood education.

SOURCE: Organization for Economic Cooperation and Development (OECD). (2006). *Education at a Glance: OECD Indicators 2006*, table C1.2. Paris: Author.

Figure 2. Range of ages at which over 90 percent of the population is enrolled in formal education, and ending age of compulsory education, by country: 2004



¹For the age range at which over 90 percent of the population is enrolled in formal education, data for Canada are not available.

²The United Kingdom includes England, Northern Ireland, Scotland, and Wales.

³The average ending age of compulsory education in the United States is 17. This age varies across states, ranging from 16 to 18; the modal age is 16 (*Digest of Education Statistics, 2005*, table 147, U.S. Department of Education, National Center for Education Statistics, 2006).

NOTE: Reference year is 2004 for population and enrollment data in all countries; however, reference dates may differ within that year. Enrollment in formal education at the preprimary education level includes children who attended center-based programs and excludes children in home-based early childhood education. The ending age of compulsory education is the age at which individuals are no longer required to participate in formal education. For example, an ending age of 18 indicates that all students under 18 are legally obliged to participate in formal education.

SOURCE: Organization for Economic Cooperation and Development (OECD). (2006). *Education at a Glance: OECD Indicators, 2006*, table C1.2. Paris: Author.

FOREIGN STUDENTS IN HIGHER EDUCATION

Key Findings: Canada, France, Germany, Italy, Japan, Russian Federation, United Kingdom, United States

Among the G-8 countries, the United States had the most foreign students (in absolute numbers) enrolled in higher education, but foreign students made up a higher percentage of enrollment in higher education in Canada, France, Germany, and the United Kingdom.

Over the past 3 decades, the number of foreign students (i.e., students enrolled outside their country of citizenship) in higher education has grown more than fourfold: from 0.6 million worldwide in 1975 to 2.7 million in 2004 (OECD 2006a). In 2004, G-8 countries hosted about two-thirds of the foreign students in higher education, with a majority of them enrolled in four countries: the United States, which received the largest percentage of these foreign students (22 percent); the United Kingdom (11 percent); Germany (10 percent); and France (9 percent) (figure 3a). Altogether, in 2004, these four G-8 countries accounted for 52 percent of all foreign students enrolled in higher education.

In addition to examining how many foreign students are hosted by each G-8 country (as a percentage of all foreign students enrolled

in higher education), the extent of student mobility in the G-8 countries can be examined by two measures that take into account the size of a country's higher education system: (1) the percentage of a country's students enrolled in higher education who are foreign students (i.e., foreign students by country of destination) and (2) the percentage of a country's students enrolled in higher education who study abroad (i.e., foreign students by country of origin).

Among the G-8 countries, the United States had the most foreign students (in absolute numbers) enrolled in higher education, but foreign students made up a higher percentage of enrollment in higher education in the United Kingdom (16 percent) as well as in Germany, France, and Canada (11 percent each) (figure 3b). The United States was one of the countries with the smallest percentages of foreign students (3 percent); the others were Japan (3 percent), Italy (2 percent), and the Russian Federation (1 percent).

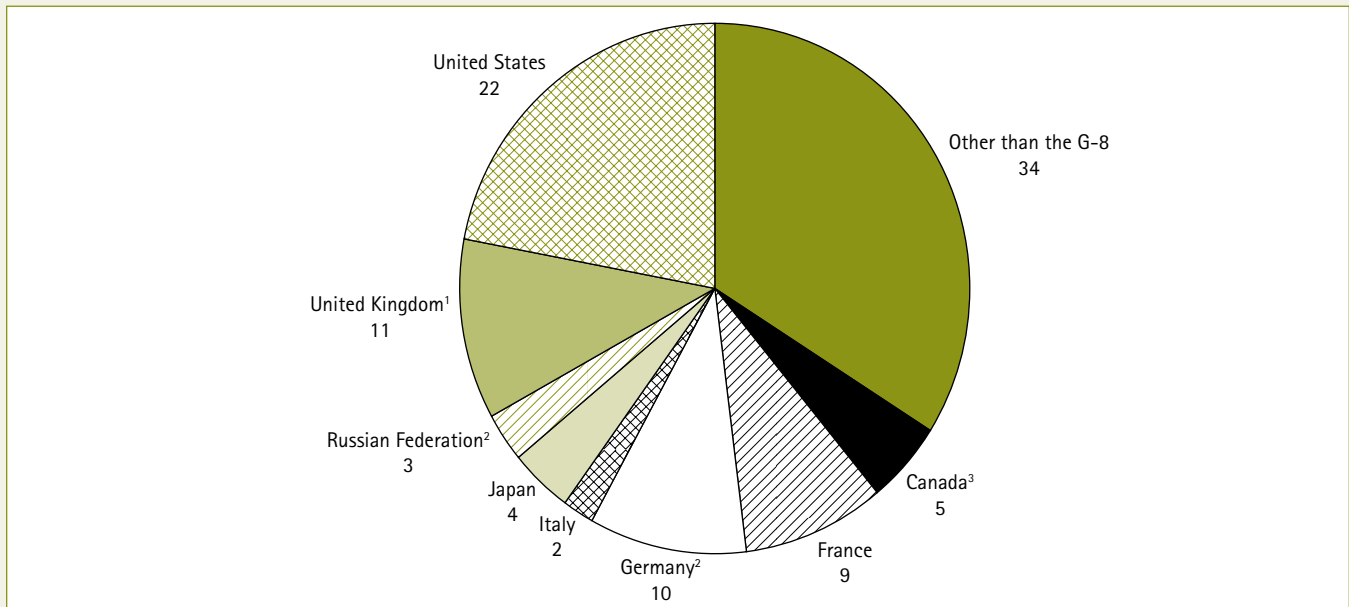
With the exception of the Russian Federation, all of the G-8 countries had a greater percentage of students coming into the country than going abroad to study. The percentage of students enrolled in higher education and going abroad to study was between 1 and 2 percent for all of the G-8 countries.

Definitions and Methodology

Foreign students are defined as noncitizens enrolled in education programs in a host country (thus, some permanent residents are included). As shown in the figures, education levels are defined accord-

ing to the International Standard Classification of Education (ISCED). For more information on the ISCED levels, see appendix A.

Figure 3a. Percentage distribution of foreign students enrolled in higher education programs, by country of destination: 2004



¹The United Kingdom includes England, Northern Ireland, Scotland, and Wales.

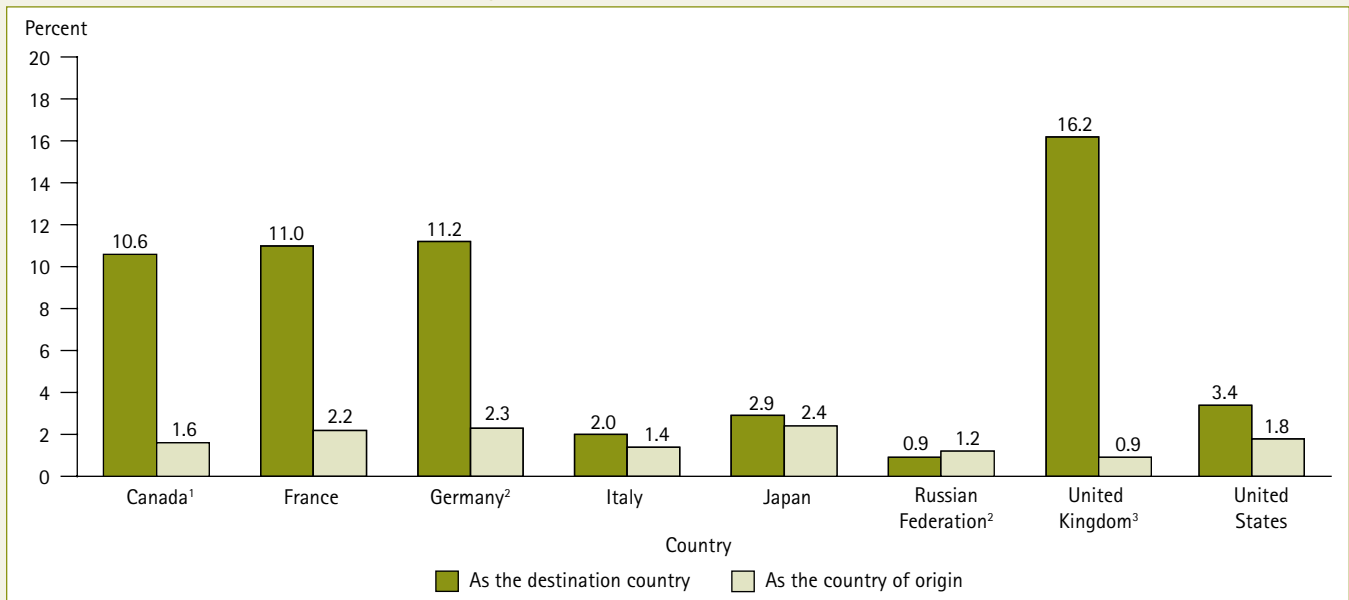
²Excludes advanced research programs (i.e., doctoral level of academic higher education).

³Reference year is 2002 rather than 2004.

NOTE: Foreign students are defined as noncitizens enrolled in education programs in a host country (thus, some permanent residents are included). Data show the percentage of enrolled foreign students in each G-8 country of destination. Countries of origin include 30 OECD countries, 177 non-OECD countries, and some nonspecified countries. Education levels are defined according to the International Standard Classification of Education (ISCED). Except where otherwise noted, data shown include ISCED levels 5A (academic higher education below the doctoral level), 5B (vocational higher education), and 6 (doctoral level of academic higher education). For more information on the ISCED levels, see appendix A in this report.

SOURCE: Organization for Economic Cooperation and Development (OECD). (2006). *Education at a Glance: OECD Indicators 2006*, table C3.8. Paris: Author.

Figure 3b. Foreign students as a percentage of all students enrolled in higher education programs, by country of destination and country of origin: 2004



¹Reference year is 2002 rather than 2004.

²Excludes advanced research programs (i.e., doctoral level of academic higher education).

³The United Kingdom includes England, Northern Ireland, Scotland, and Wales.

NOTE: Foreign students are defined as noncitizens enrolled in education programs in a host country (thus, some permanent residents are included). Countries of origin include 30 OECD countries, 177 non-OECD countries, and some nonspecified countries. Education levels are defined according to the International Standard Classification of Education (ISCED). Except where otherwise noted, data shown include ISCED levels 5A (academic higher education below the doctoral level), 5B (vocational higher education), and 6 (doctoral level of academic higher education). For more information on the ISCED levels, see appendix A in this report.

SOURCE: Organization for Economic Cooperation and Development (OECD). (2006). *Education at a Glance: OECD Indicators 2006*, tables C3.1 and C3.2. Paris: Author.



INDICATORS PART II

Academic Performance

ACADEMIC PERFORMANCE OF FOURTH-GRADERS IN MATHEMATICS AND SCIENCE

Key Findings: Italy, Japan, Russian Federation, United Kingdom (England and Scotland only),⁴ United States

On the TIMSS 2003 fourth-grade mathematics assessment, students in Japan outperformed students in the other participating G-8 countries, with higher percentages of students in Japan reaching each international benchmark.

The Trends in International Mathematics and Science Study (TIMSS) assessed students in fourth and eighth grade in mathematics and science in 2003. This indicator presents the percentage of fourth-grade students reaching the four international benchmarks (low, intermediate, high, and advanced) that were established in each of the two subject areas.

On the TIMSS 2003 fourth-grade mathematics assessment, students in Japan outperformed students in the other participating G-8 countries, with higher percentages of students in Japan reaching each benchmark. In Japan, 89 percent of fourth-grade students were at or above the intermediate benchmark in mathematics; the percentages in the other G-8 countries ranged from 60 percent in Scotland to 76 percent in the Russian Federation (figure 4). In the United States, 72 percent of students met the intermediate benchmark in mathematics.

Similarly, a higher percentage of fourth-grade students in Japan than in the other G-8 countries were at or above the high benchmark in mathematics. In Japan, 60 percent of fourth-grade students reached the high benchmark, while in the other countries, the percentages ranged from 22 percent in Scotland to 43 percent in

England. In the United States, 35 percent of fourth-graders reached the high benchmark in mathematics.

The highest international benchmark, advanced, was reached by 21 percent of Japan's fourth-grade students in mathematics, compared with percentages ranging from 3 percent in Scotland to 14 percent in England. In the United States, 7 percent of fourth-graders reached the advanced benchmark in mathematics.

As in mathematics, a greater percentage of Japanese students than their peers in the other G-8 countries were at or above the intermediate benchmark in science. In Japan, 84 percent of fourth-graders met the intermediate benchmark, compared with percentages ranging from 66 percent in Scotland to 79 percent in England. In the United States, 78 percent of fourth-graders met the intermediate benchmark in science.

The percentages of fourth-grade students at or above the high achievement benchmark in science ranged from 27 percent in Scotland to 49 percent in Japan. In the United States, 45 percent of students reached the high benchmark in science.

The percentages of students meeting the advanced benchmark in science ranged from 5 percent in Scotland to 15 percent in England (with Japan at 12 percent). In the United States, 13 percent of fourth-graders reached the advanced benchmark. Thus, whereas higher percentages of students in Japan than in the other G-8 countries reached each benchmark in mathematics, this was not a consistent finding in science.

Definitions and Methodology

On the 2003 Trends in International Mathematics and Science Study (TIMSS 2003), countries were required to sample students in the upper of the two grades that contained the largest number of 9-year-olds. In the United States and most countries, this corresponds to grade 4.

Since the TIMSS mathematics and science achievement scales were designed to provide reliable measures of student achievement over time, the metric of the scale was established originally with the 1995 assessment. To facilitate the cross country comparison of achievement scores, an international average was calculated whereby all the participating countries contributed equally. The data were then standardized to set the international average at 500, with a range from 0 to 1000 and a standard deviation of 100. Since the individual country means were weighted averages of the student scores, this standardization implied that about two-thirds of the students across all the participating countries scored between 400 and 600.

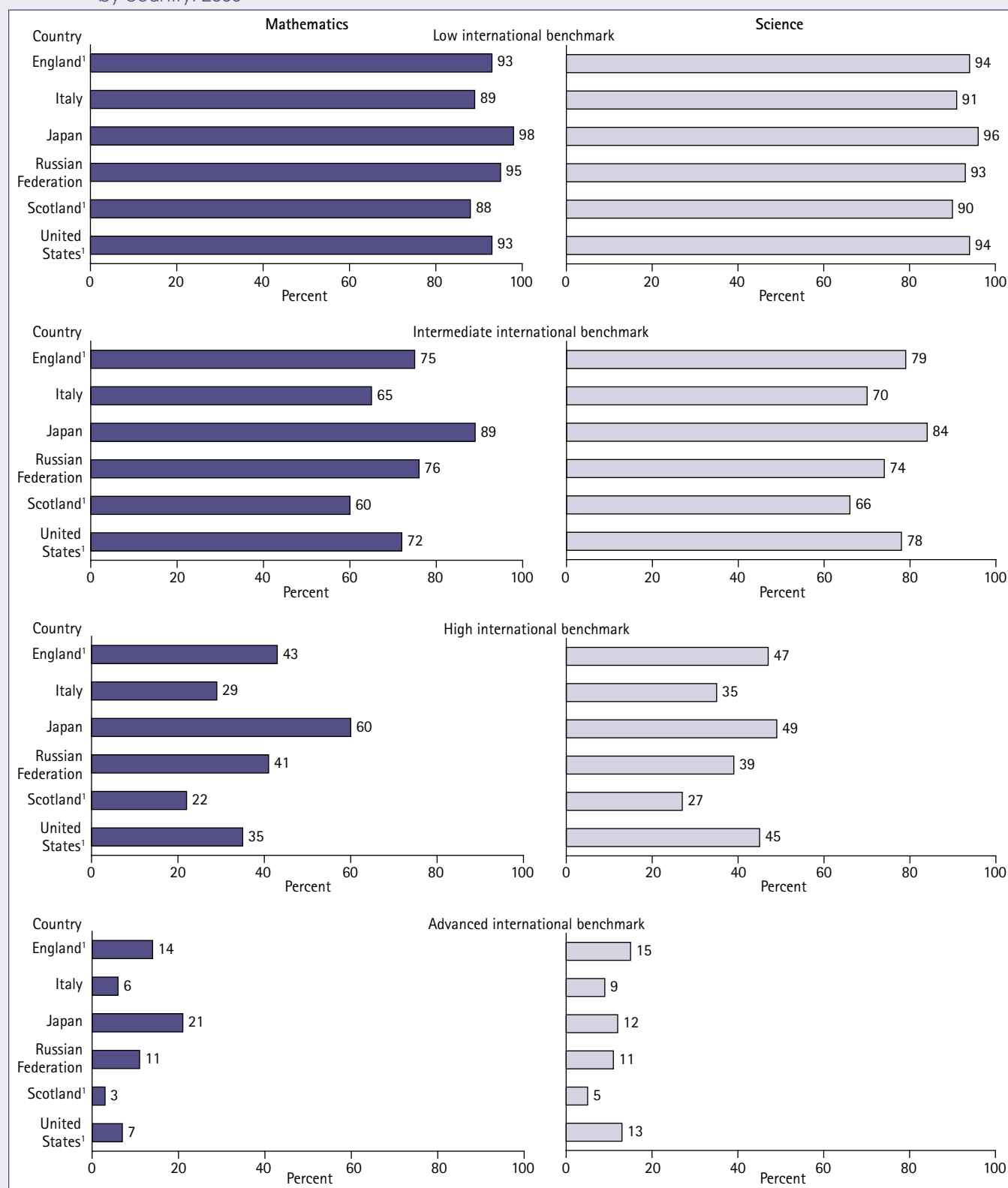
In order to provide meaningful descriptions of what performance on the scales could mean in terms of the mathematics or science that students know and can do, TIMSS established four international achievement benchmarks in mathematics and science (low, intermediate, high, and advanced). Four points on the scales were identified for use as international benchmarks: 625 for the advanced benchmark, 550 for the high benchmark, 475 for the intermediate benchmark, and 400 for the low benchmark. These were selected to represent the range of performance shown by students internationally.

At the fourth-grade level in mathematics, students at the low benchmark demonstrate some basic mathematical knowledge, such as an understanding of whole numbers and the properties of basic geometric shapes. At the intermediate benchmark, students can apply basic mathematical knowledge in straightforward situations, such as performing operations with 3- and 4-digit numbers and decimals and extending simple patterns. At the high benchmark, students can apply their knowledge and understanding to solve problems, such as multistep word problems involving addition, multiplication, and division and problems requiring the use of data in tables and graphs. Students at the advanced benchmark demonstrate an understanding of fractions, decimals, and measurement concepts, and use data interpretation in a wide variety of relatively complex situations.

At the fourth-grade level in science, students at the low benchmark demonstrate some elementary knowledge of the earth, life, and physical sciences, such as simple facts about magnets, electricity, and boiling. At the intermediate benchmark, students can apply basic knowledge and understanding to practical situations in the sciences, such as knowing some basic information about Earth's features and processes, human biology, and health. At the high benchmark, students can apply knowledge and understanding to explain everyday phenomena, such as demonstrating some knowledge of life processes, physical states, and chemical changes. Students at the advanced benchmark can apply knowledge and understanding in beginning scientific inquiry, such as classifying organisms according to major physical and behavioral features.

⁴In the data source for this indicator (TIMSS 2003), the United Kingdom is represented separately by two of its component jurisdictions, England and Scotland. Northern Ireland and Wales did not participate in this study.

Figure 4. Percentage of fourth-grade students reaching TIMSS international benchmarks in mathematics and science, by country: 2003



¹Met guidelines for sample participation rates only after replacement schools were included. That is, to avoid sample size losses resulting from sampled schools not participating in the 2003 Trends in International Mathematics and Science Study (TIMSS 2003), a mechanism was instituted to identify, a priori, replacement schools that have similar characteristics to the sampled schools that they may replace.

SOURCE: Martin, M.O., Mullis, I.V.S., Gonzalez, E.J., and Chrostowski, S.J. (2004). *TIMSS 2003 International Science Report: Findings From IEA's Trends in International Mathematics and Science Study at the Fourth and Eighth Grades*, exhibit 2.2. Chestnut Hill, MA: Boston College; and Mullis, I.V.S., Martin, M.O., Gonzalez, E.J., and Chrostowski, S.J. (2004). *TIMSS 2003 International Mathematics Report: Findings From IEA's Trends in International Mathematics and Science Study at the Fourth and Eighth Grades*, exhibit 2.2. Chestnut Hill, MA: Boston College.

DIFFERENCES IN FOURTH-GRADE MATHEMATICS AND SCIENCE ACHIEVEMENT BY SEX

Key Findings: Italy, Japan, Russian Federation, United Kingdom (England and Scotland only),⁵ United States

In the United States and Scotland, fourth-grade males scored higher, on average, than fourth-grade females in both mathematics and science achievement.

The Trends in International Mathematics and Science Study (TIMSS) assessed fourth- and eighth-grade students in mathematics and science in 2003. This indicator addresses differences by sex in mathematics and science achievement among fourth-grade students in participating G-8 countries.

On the TIMSS 2003 mathematics assessment, fourth-grade males in Italy, Scotland, and the United States outperformed females. In the United States, the difference in performance was 8 points, with males scoring an average of 522 compared with 514 among females

(figures 5a and 5b). In Italy, the difference by sex was 9 points (507 for males vs. 498 for females), and in Scotland, the difference by sex was 11 points (496 for males vs. 485 for females). In England, Japan, and the Russian Federation, no measurable differences were detected between the average scale scores of fourth-grade males and females.

On the TIMSS 2003 science assessment, the United States and Scotland were the only G-8 countries where there was a difference by sex in the average scale scores of fourth-graders. In the United States, fourth-grade males scored 5 points higher than fourth-grade females (538 versus 533); in Scotland, males outperformed females by an average of 11 points (508 versus 496). In England, Italy, Japan, and the Russian Federation, no measurable differences by sex were detected in the performance of fourth-grade students.

Definitions and Methodology

On the 2003 Trends in International Mathematics and Science Study (TIMSS 2003), countries were required to sample students in the upper of the two grades that contained the largest number of 9-year-olds. In the United States and most countries, this corresponds to grade 4.

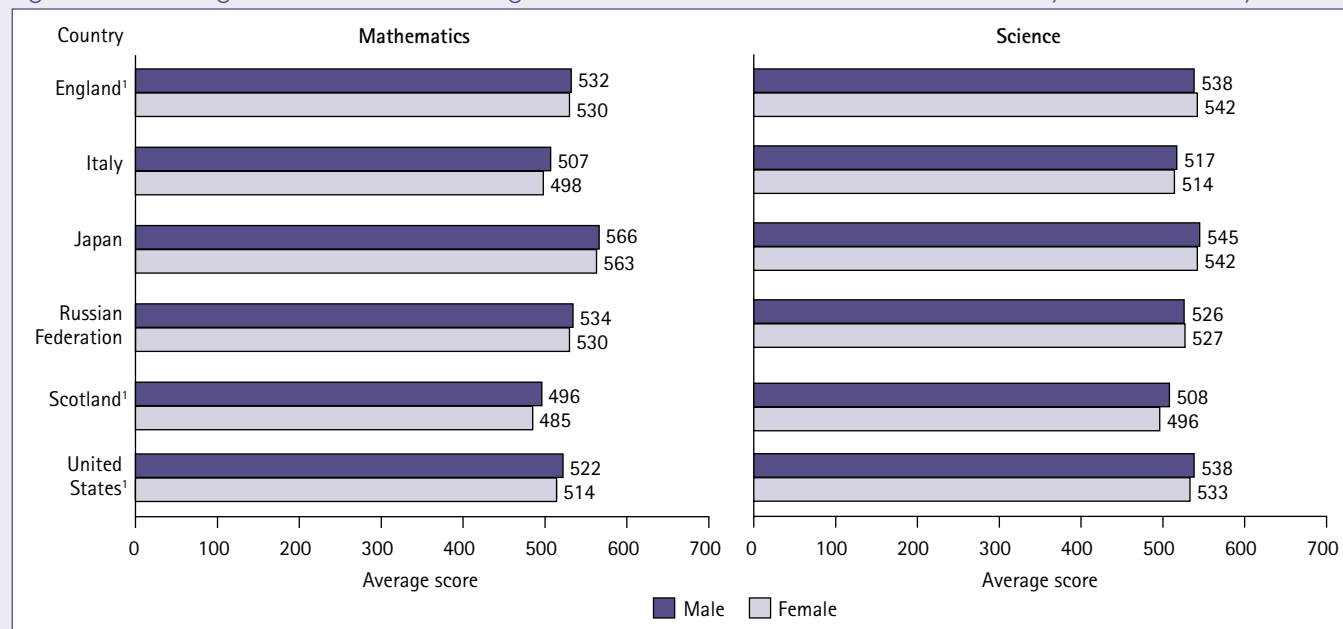
Since the TIMSS mathematics and science achievement scales were designed to provide reliable measures of student achievement over time, the metric of the scale was established originally with the 1995 assessment. To facilitate the cross country comparison of achievement scores, an international average was calculated whereby all the participating countries contributed equally. The

data were then standardized to set the international average at 500, with a range from 0 to 1000 and a standard deviation of 100. Since the individual country means were weighted averages of the student scores, this standardization implied that about two-thirds of the students across all the participating countries scored between 400 and 600.

Male-female score-point differences in mathematics and science achievement presented in the text and in figure 5b are computed from unrounded numbers; therefore, they may differ from computations made using the rounded whole numbers that appear in figure 5a.

⁵In the data source for this indicator (TIMSS 2003), the United Kingdom is represented separately by two of its component jurisdictions, England and Scotland. Northern Ireland and Wales did not participate in this study.

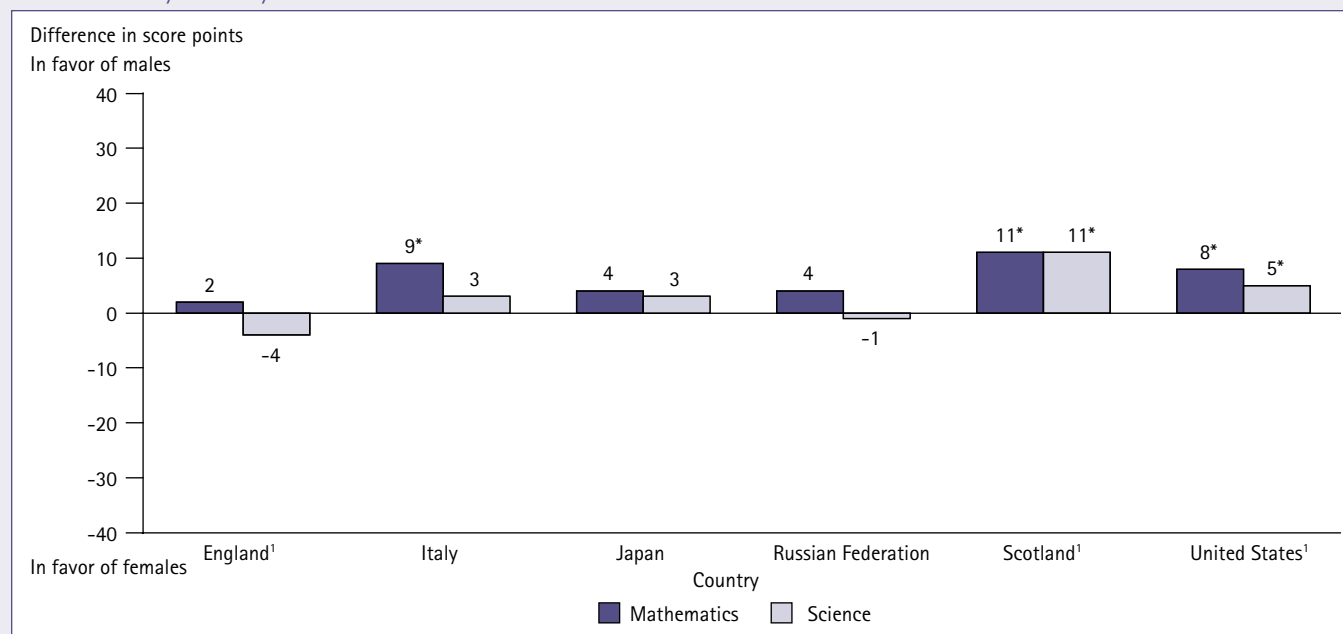
Figure 5a. Average scale scores of fourth-grade students in mathematics and science, by sex and country: 2003



¹Met guidelines for sample participation rates only after replacement schools were included. That is, to avoid sample size losses resulting from sampled schools not participating, a mechanism was instituted to identify, a priori, replacement schools that have similar characteristics to the sampled schools that they may replace.

SOURCE: Martin, M.O., Mullis, I.V.S., Gonzalez, E.J., and Chrostowski, S.J. (2004). *TIMSS 2003 International Science Report: Findings From IEA's Trends in International Mathematics and Science Study at the Fourth and Eighth Grades*, exhibit 1.4. Chestnut Hill, MA: Boston College; and Mullis, I.V.S., Martin, M.O., Gonzalez, E.J., and Chrostowski, S.J. (2004). *TIMSS 2003 International Mathematics Report: Findings From IEA's Trends in International Mathematics and Science Study at the Fourth and Eighth Grades*, exhibit 1.4. Chestnut Hill, MA: Boston College.

Figure 5b. Difference in average scale scores between fourth-grade males and females in mathematics and science, by country: 2003



*p < .05 (difference in score points is statistically significant).

¹Met guidelines for sample participation rates only after replacement schools were included. That is, to avoid sample size losses resulting from sampled schools not participating, a mechanism was instituted to identify, a priori, replacement schools that have similar characteristics to the sampled schools that they may replace.

NOTE: Differences shown are computed by subtracting the average unrounded score for females from the average unrounded score for males. Thus, positive values indicate higher average scores for males.

SOURCE: Martin, M.O., Mullis, I.V.S., Gonzalez, E.J., and Chrostowski, S.J. (2004). *TIMSS 2003 International Science Report: Findings From IEA's Trends in International Mathematics and Science Study at the Fourth and Eighth Grades*, exhibit 1.4. Chestnut Hill, MA: Boston College; and Mullis, I.V.S., Martin, M.O., Gonzalez, E.J., and Chrostowski, S.J. (2004). *TIMSS 2003 International Mathematics Report: Findings From IEA's Trends in International Mathematics and Science Study at the Fourth and Eighth Grades*, exhibit 1.4. Chestnut Hill, MA: Boston College.

MATHEMATICS PROFICIENCY OF 15-YEAR-OLDS

Key Findings: Canada, France, Germany, Italy, Japan, Russian Federation, United States

About one-quarter of 15-year-old students in the United States scored at or below the lowest proficiency level on the PISA 2003 combined mathematics literacy scale, a higher proportion of students than in Germany, France, Japan, and Canada.

The Program for International Student Assessment (PISA) is a system of international assessments that measures 15-year-old students' capabilities in reading literacy, mathematics literacy, and science literacy every 3 years. In 2003, PISA was conducted in 41 countries, including 30 Organization for Economic Cooperation and Development (OECD) countries and 11 non-OECD countries. PISA 2003 included an in-depth assessment of mathematics literacy, with less detailed assessments in reading and science literacy. In PISA 2003, each student was awarded a score on the combined mathematics literacy scale based on the difficulty of the tasks that he or she could reliably perform. These student performance scores were also used to create six proficiency levels, with level 6 the highest. Students who failed to complete the tasks associated with level 1 were categorized as having proficiency below level 1.

In Japan, Canada, France, and Germany, students performed, on average, at proficiency level 3 on the PISA 2003 combined mathematics

literacy scale; in the United States, the average score of 483 (see Indicator 7: Mathematics Performance of 15-Year-Olds Across Content Areas) was above the bottom cut point for level 3 by about 1 score point. Students in the Russian Federation and Italy scored, on average, at level 2 on the combined mathematics literacy scale.

Looking at the distribution of students across the mathematics proficiency levels, 26 percent of U.S. students scored at level 1 or below; these students failed to demonstrate consistently that they have baseline mathematical skills (figure 6). The U.S. percentage was higher than the percentages in four of the other G-8 countries reporting data⁶ (Germany, France, Japan, and Canada), but lower than the percentages in the Russian Federation and Italy.

The United States had a lower percentage of students at each of the higher proficiency levels of 4, 5, and 6 than did Germany, France, Japan, and Canada. None of the other G-8 countries had a lower percentage of students scoring at level 6 (the highest proficiency level) than the United States. The PISA 2003 results are somewhat different from those for PISA 2000, when reading literacy was the major domain and the United States had a higher percentage of students at the lowest proficiency level, but also a higher percentage of students at the highest proficiency level (Lemke et al. 2001).

Definitions and Methodology

PISA defines mathematics literacy as "an individual's capacity to identify and understand the role that mathematics plays in the world, to make well-founded judgments and to use and engage with mathematics in ways that meet the needs of that individual's life as a constructive, concerned and reflective citizen" (OECD 2003).

To facilitate the cross country comparison of achievement scores on the PISA 2003 combined mathematics literacy scale, an OECD average was calculated whereby all the participating OECD countries contributed equally. The data were then standardized to set the OECD average at 500, with a range from 0 to 1000 and a standard deviation of 100. Since the individual country means were weighted averages of the student scores, this standardization implied that about two-thirds of the students across all the participating OECD countries scored between 400 and 600.

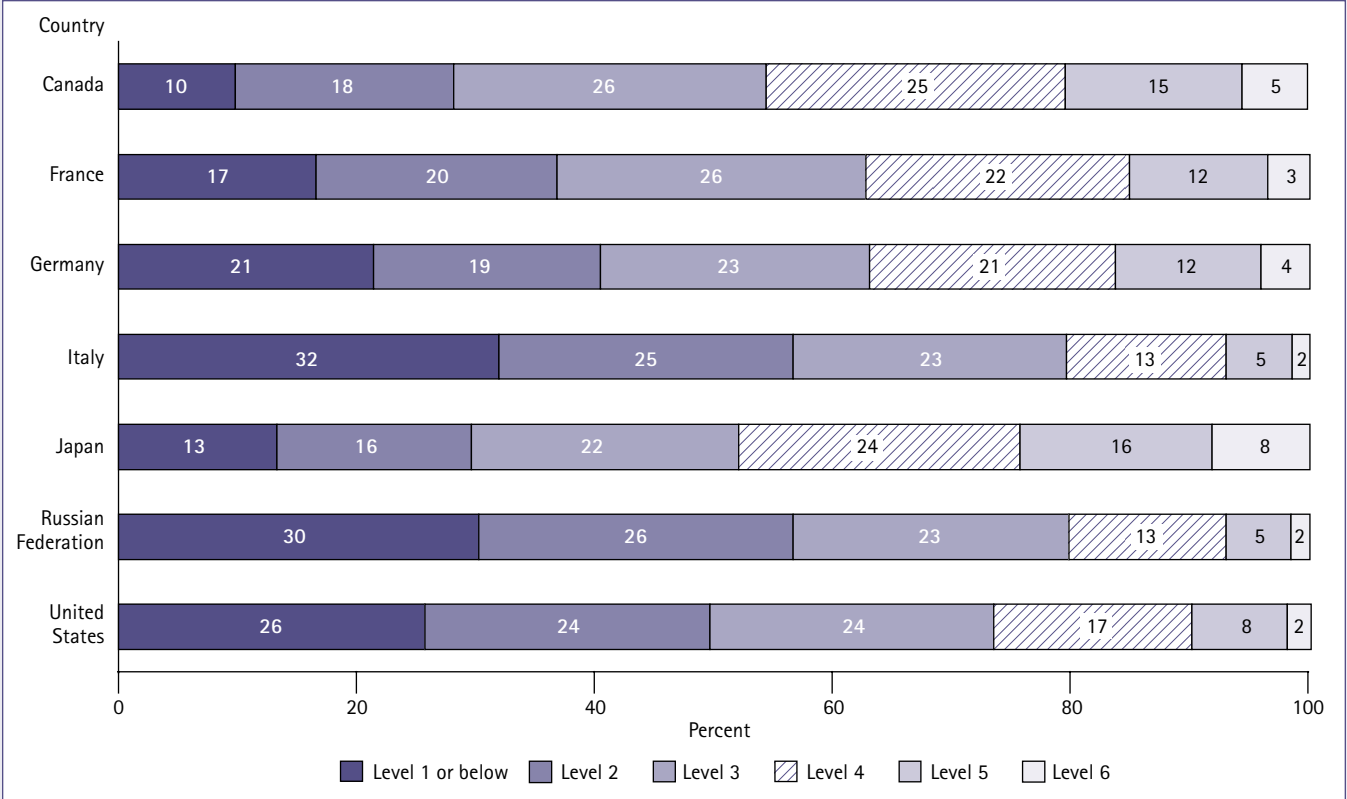
Mathematics proficiency was defined in terms of six levels (levels 1 through 6) based on student performance scores on the combined mathematics literacy scale. Exact cut point scores are as follows: below level 1 (a score less than or equal to 357.77); level 1 (a score greater than 357.77 and less than or equal to 420.07); level 2 (a score greater than 420.07 and less than or equal to 482.38); level 3 (a score greater than 482.38 and less than or equal to 544.68); level 4 (a score greater than 544.68 and less than or equal to 606.99); level 5 (a score greater than 606.99 and less than or equal to 669.30); and level 6 (a score greater than 669.30). In order to reach a particular proficiency level, a student must have been able to correctly answer a majority of items at that level. Students at each succeeding level are capable of solving mathematical problems of increasing complexity.

Students proficient at level 1 are able to identify information and carry out routine procedures according to direct instructions in

explicit situations, such as locating and reading a specified value in a simple table or performing simple calculations involving relationships between two familiar variables. Level 2 can be considered the baseline at which students begin to demonstrate mathematical skills allowing them to use mathematics actively; they can extract relevant information from a single source and make literal interpretations of the results, such as recognizing simple geometric patterns and identifying relevant information in a simple and familiar graph. At level 3, students can use simple problem-solving strategies and skills, such as reasoning in familiar contexts, interpreting tables to locate information, and basic reasoning with simple probability concepts; they can link and connect multiple related representations (e.g., a formula and a graph) and carry out clearly described procedures requiring sequential processes. At level 4, students can reason flexibly and with some insight; they can solve problems that involve reasoning and argumentation in unfamiliar contexts, interpret complex text and graphs, and use multiple representations and multi-step calculations to solve practical problems. Students at level 5 can use well-developed reasoning skills, insight, and interpretation with different representations; interpret complex information about real-world situations; work strategically; use complex and multistep problem-solving skills; and make assumptions or work with assumptions to solve problems. Students proficient at level 6 can identify and combine multiple pieces of information to solve complex problems in the context of unfamiliar real-world situations; they can carry out a complex sequence of calculations and communicate complex arguments and explanations through reflection, insight, and generalization of the results. For more information about how proficiency levels were set for PISA 2003, see the technical appendix in Lemke et al. (2004).

⁶Due to low response rates, data for the United Kingdom are not shown in this indicator.

Figure 6. Percentage distribution of 15-year-old students on the PISA 2003 proficiency levels for combined mathematics literacy scale, by country: 2003



NOTE: In the Program for International Student Assessment (PISA), mathematics proficiency was defined in terms of six levels (levels 1 through 6) based on student performance scores on the combined mathematics literacy scale. In this way, mathematics literacy was assessed along a continuum, with level 1 or below indicative of the lowest performing students. Due to low response rates, data for the United Kingdom are not shown. Detail may not sum to totals because of rounding.

SOURCE: Organization for Economic Cooperation and Development (OECD), Program for International Student Assessment (PISA), 2003.

MATHEMATICS PERFORMANCE OF 15-YEAR-OLDS ACROSS CONTENT AREAS

Key Findings: Canada, France, Germany, Italy, Japan, Russian Federation, United States

In the United States, 15-year-old students in PISA 2003 generally scored lower than their peers in Canada, France, Germany, and Japan on each of the four mathematics literacy subscales: space and shape, change and relationships, quantity, and uncertainty.

The Program for International Student Assessment (PISA) assessed 15-year-old students in mathematics literacy in 2003. In the United States, 15-year-old students had an average score of 483 on the PISA 2003 combined mathematics literacy scale (figure 7). The U.S. score was lower than the average score of 500 for the participating Organization for Economic Cooperation and Development (OECD) countries (data not shown) (Lemke et al. 2004). Among the G-8 countries reporting data,⁷ the U.S. score was lower than the average scores for Germany, France, Canada, and Japan and higher than the average scores for the Russian Federation and Italy.

For the most part, U.S. 15-year-olds scored lower than their peers in Canada, France, Germany, and Japan on the four mathematics literacy subscales, with each subscale representing a different content area: space and shape, change and relationships, quantity,

and uncertainty. (There was one exception: no measurable difference between the United States and Germany on the uncertainty subscale.) For example, the U.S. mean score of 472 on the space and shape subscale was lower than the mean scores for Germany (500), France (508), Canada (518), and Japan (553). Among the G-8 countries, students in Japan earned the highest score on the space and shape subscale, followed by students in Canada.

On the change and relationships subscale, 15-year-olds in Japan and Canada earned the highest mean scores: 536 and 537, respectively. Students in the United States had a mean score of 486, outscoring only students in Italy (452). Similarly, on the quantity subscale, students in Japan and Canada earned mean scores of 527 and 528, respectively, outscoring students in all other G-8 countries. Students in Germany and France scored 514 and 507, respectively, and students in the United States had a mean score of 476.

On the uncertainty subscale, students in the United States received a mean scale score of 491, outscoring students in Italy and the Russian Federation, who had mean scores of 463 and 436, respectively. Among the G-8 countries, students in Canada earned the highest score on this subscale, followed by students in Japan, with scores of 542 and 528, respectively.

Definitions and Methodology

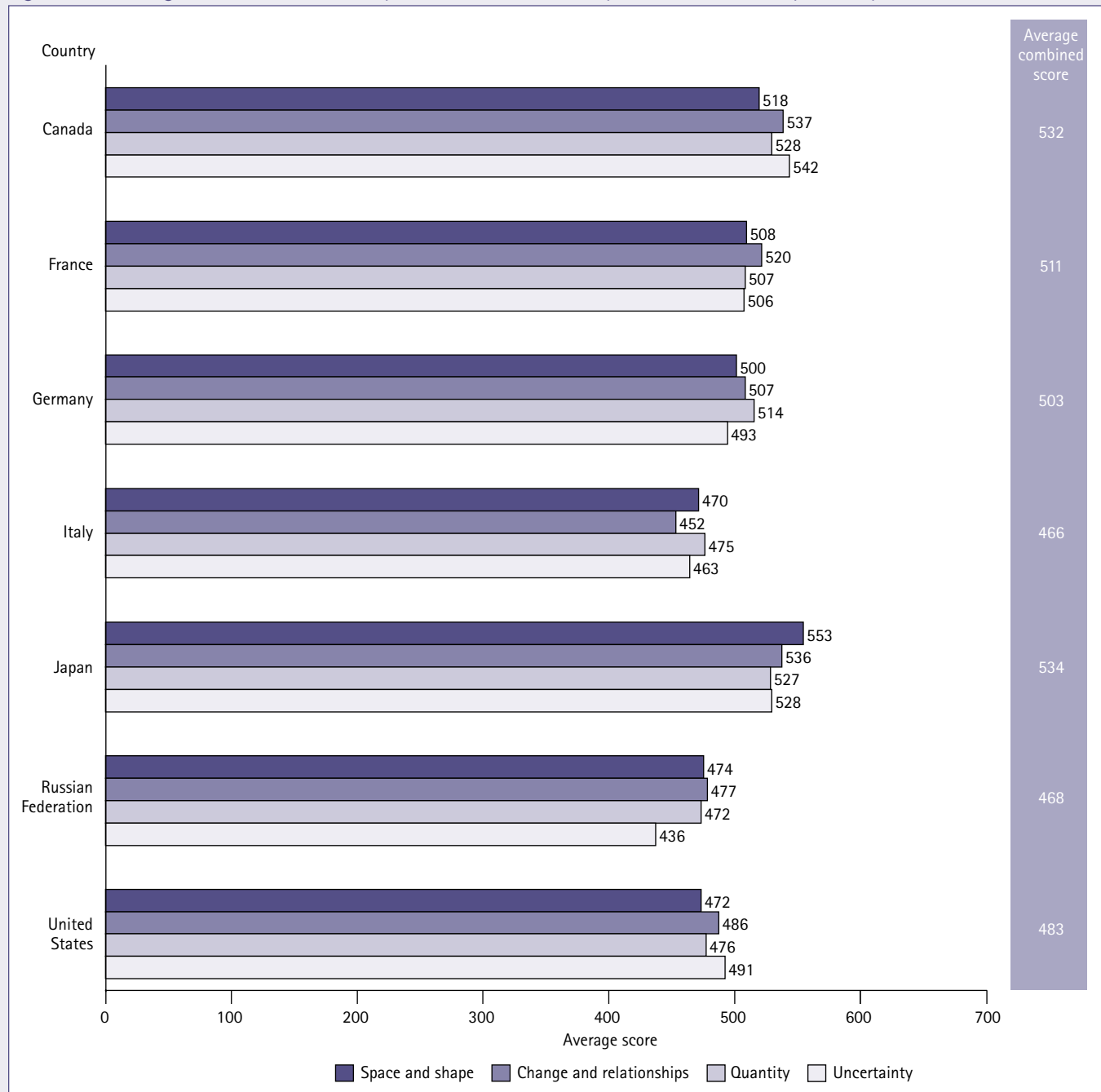
PISA defines mathematics literacy as “an individual’s capacity to identify and understand the role that mathematics plays in the world, to make well-founded judgments and to use and engage with mathematics in ways that meet the needs of that individual’s life as a constructive, concerned and reflective citizen” (OECD 2003). In PISA 2003, students were assessed on their mathematical knowledge in four content areas (space and shape, change and relationships, quantity, and uncertainty), as well as the processes that need to be performed to solve mathematical problems in these four content areas and the real-world situations in which students encounter such mathematical problems. The space and shape subscale is related to spatial and geometric phenomena and relationships. The change and relationships subscale pertains to mathematical manifestations of change, functional relationships,

and dependency among variables. The quantity subscale is related to numeric phenomena and quantitative relationships and patterns. The uncertainty subscale focuses on probabilistic and statistical phenomena and relationships.

To facilitate the cross country comparison of achievement scores on the PISA 2003 combined mathematics literacy scale, an OECD average was calculated whereby all the participating OECD countries contributed equally. The data were then standardized to set the OECD average at 500, with a range from 0 to 1000 and a standard deviation of 100. Since the individual country means were weighted averages of the student scores, this standardization implied that about two-thirds of the students across all the participating OECD countries scored between 400 and 600.

⁷Due to low response rates, data for the United Kingdom are not shown in this indicator.

Figure 7. Average mathematics literacy subscale scores of 15-year-old students, by country: 2003



NOTE: The space and shape subscale is related to spatial and geometric phenomena and relationships. The change and relationships subscale pertains to mathematical manifestations of change, functional relationships, and dependency among variables. The quantity subscale is related to numeric phenomena and quantitative relationships and patterns. The uncertainty subscale focuses on probabilistic and statistical phenomena and relationships. Due to low response rates, data for the United Kingdom are not shown.

SOURCE: Organization for Economic Cooperation and Development (OECD). (2004). *Learning for Tomorrow's World: First Results From PISA 2003*, tables 2.1c, 2.2c, 2.3c, 2.4c, and 2.5c. Paris: Author.

MATHEMATICS ACHIEVEMENT AND SOCIOECONOMIC STATUS

Key Findings: Canada, France, Germany, Italy, Japan, Russian Federation, United States

Although U.S. students were generally at an advantage in terms of socioeconomic status (SES) compared to their G-8 peers, low-SES 15-year-old students in the United States were outperformed by their peers in Germany, France, Japan, and Canada in mathematics literacy.

The 2003 Program for International Student Assessment (PISA 2003) measured socioeconomic status (SES) based on the occupational status of the 15-year-old student's mother or father (whichever parent had the higher occupational status), with parental occupation reported by the student. Parental occupations were translated into socioeconomic index scores. For example, whereas a low index score (i.e., between 16 and 34 points) corresponds with a parental occupation requiring a minimal level of education and skill (e.g., taxi driver, waiter/waitress), a high index score (i.e., between 71 and 90 points) corresponds with a parental occupation requiring a high level of education and skill (e.g., medical doctor, university professor).

In 2003, the United States had the highest mean socioeconomic index score of all the G-8 countries reporting data⁸ (54.6 in the United States compared to a range from 46.8 in Italy to 52.6 in Canada) (data not shown). Furthermore, when students were classified into national quarters on the index, U.S. 15-year-olds in the bottom national quarter had a higher mean index score than their peers in all but one G-8 country (32.6 in the United States compared to a range from 26.9 in Italy to 31.7 in Canada). Only in Japan did students in the bottom national quarter have a higher mean index score (33.4) than their U.S. counterparts. These results show that U.S. students were generally at an advantage in terms of SES compared to their G-8 peers (both overall as well as specifically at the low SES level).

On the other hand, when looking at the mathematics achievement of low-SES students, U.S. students did not demonstrate an advantage over their counterparts in most G-8 countries. Specifically, U.S. students in the bottom national quarter of the socioeconomic index were outperformed by their peers in Germany, France, Japan, and Canada on the PISA 2003 combined mathematics literacy scale (448 in the United States compared to a range from 463 in Germany to 506 in Canada) (figure 8a). U.S. students in the bottom national quarter of the index scored higher than their counterparts in only one G-8 country—Italy (with an average score of 430).

Nevertheless, in all G-8 countries, there was a relationship between SES and achievement scores. Specifically, students in the top national quarter of the socioeconomic index scored higher on the combined mathematics literacy scale than students in the bottom national quarter of the index. This difference ranged from 58 points in the Russian Federation to 102 points in Germany; in the United States, this difference was 82 points.

Another way to evaluate the relationship between socioeconomic status and mathematics achievement is to examine the specific change in score on the combined mathematics literacy scale in response to a one-standard-deviation increase (i.e., 16.4 units) in the socioeconomic index score. A greater increase in a country's average achievement score implies a stronger relationship between socioeconomic status and performance in that country. In the United States, an increase of one standard deviation on the index was associated with an average performance increase of 30 score points (figure 8b). Compared to the United States, three G-8 countries had a weaker relationship between the socioeconomic index and mathematics literacy performance—the Russian Federation, Japan, and Canada (with a range from 21 to 24 score points)—and one G-8 country had a stronger relationship—Germany (with 38 score points).

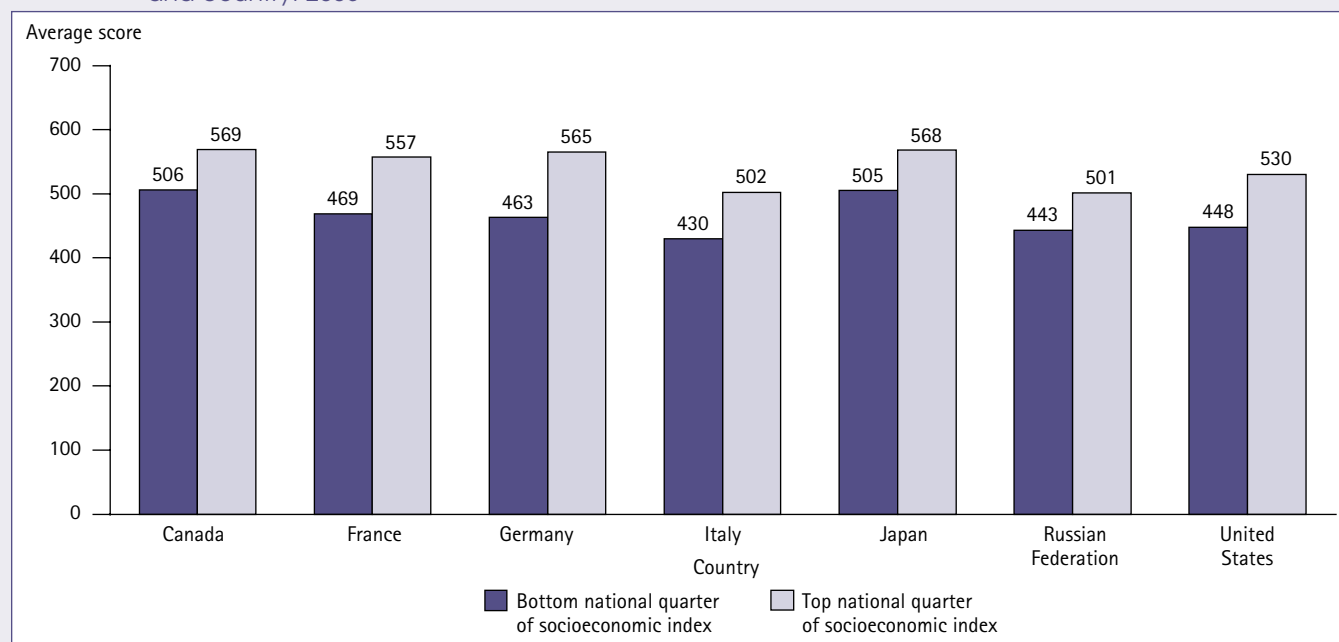
Definitions and Methodology

To facilitate the cross country comparison of achievement scores on the PISA 2003 combined mathematics literacy scale, an Organization for Economic Cooperation and Development (OECD) average was calculated whereby all the participating OECD countries contributed equally. The data were then standardized to set the OECD average at 500, with a range from 0 to 1000 and a standard deviation of 100. Since the individual country means were weighted averages of the student scores, this standardization implied that about two-thirds of the students across all the participating OECD countries scored between 400 and 600. For more information about mathematics literacy in PISA 2003, see the Definitions and Methodology section of indicators 6 and 7.

Socioeconomic status is measured by the Highest International Socioeconomic Index of Occupational Status (HISEI), which corresponds to the highest occupational index score of the student's father or mother. Parental occupation, as reported by the student, was coded based on the current version of the International Standard Classification of Occupations (ISCO-88) (International Labor Organization 1988). Occupational codes were, in turn, mapped onto an internationally comparable index of occupational status, the International Socioeconomic Index of Occupational Status (ISEI), developed by Ganzeboom, De Graaf, and Treiman (1992). The ISEI captures the attributes of occupations that convert parents' education into income. It is derived by optimally scaling occupation groups to maximize the indirect effect of education on income through occupation and to minimize the direct effect of education on income, net of occupation (both effects being net of age).

⁸Due to low response rates, data for the United Kingdom are not shown in this indicator.

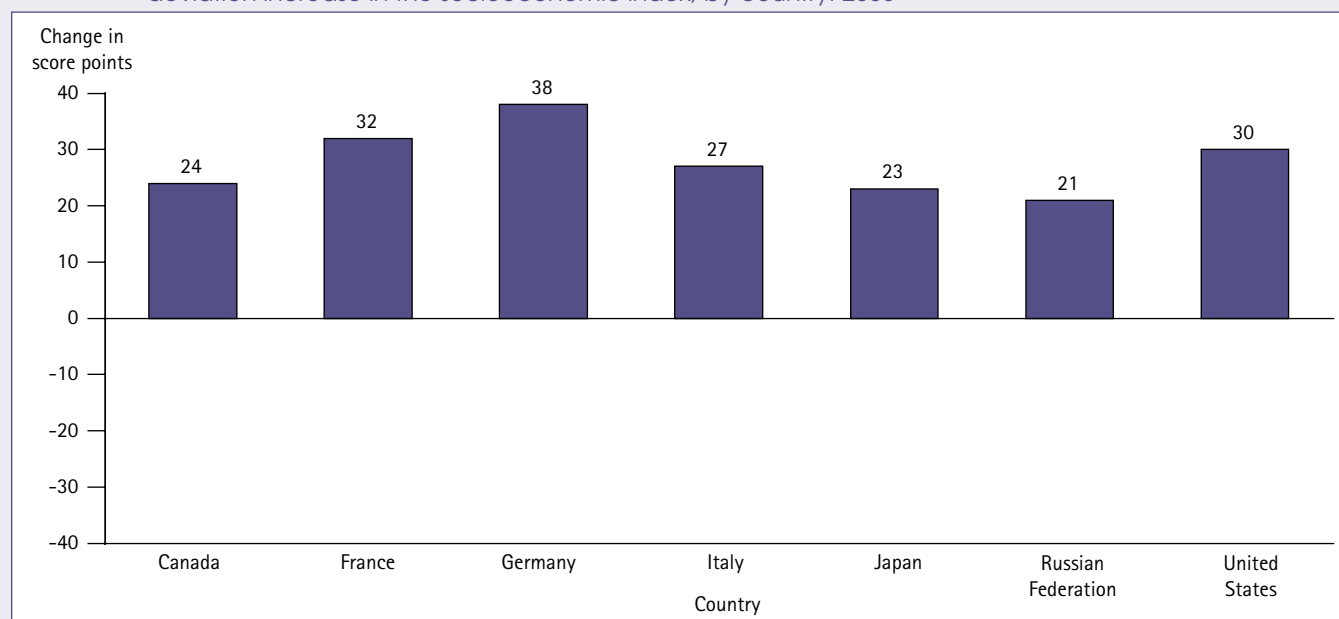
Figure 8a. Combined mathematics literacy scores of 15-year-old students in PISA 2003, by socioeconomic status and country: 2003



NOTE: In the 2003 Program for International Student Assessment (PISA 2003), socioeconomic status is measured by the Highest International Socioeconomic Index of Occupational Status (HISEI), which corresponds to the highest occupational index score of the student's father or mother. This information, derived from students' responses to questionnaire items pertaining to parental occupation, is transformed into an index developed by Ganzeboom, De Graaf, and Treiman (1992). The index is keyed to the International Standard Classification of Occupations (ISCO) and allows direct comparisons between nations. Due to low response rates, data for the United Kingdom are not shown.

SOURCE: Organization for Economic Cooperation and Development (OECD). (2004). *Learning for Tomorrow's World: First Results From PISA 2003*, table 4.2a. Paris: Author.

Figure 8b. Change in the combined mathematics literacy scores of 15-year-old students in PISA 2003 per one-standard-deviation increase in the socioeconomic index, by country: 2003



NOTE: In the 2003 Program for International Student Assessment (PISA 2003), socioeconomic status is measured by the Highest International Socioeconomic Index of Occupational Status (HISEI), which corresponds to the highest occupational index score of the student's father or mother. This information, derived from students' responses to questionnaire items pertaining to parental occupation, is transformed into an index developed by Ganzeboom, De Graaf, and Treiman (1992). The index is keyed to the International Standard Classification of Occupations (ISCO) and allows direct comparisons between nations. Shown in this figure is the average score-point difference that is associated with an increase of one standard deviation (i.e., 16.4 units) on the socioeconomic index. Due to low response rates, data for the United Kingdom are not shown.

SOURCE: Organization for Economic Cooperation and Development (OECD). (2004). *Learning for Tomorrow's World: First Results From PISA 2003*, table 4.2a. Paris: Author.

MATHEMATICS ACHIEVEMENT AND LANGUAGE SPOKEN AT HOME

Key Findings: Canada, France, Germany, Italy, Japan, Russian Federation, United States

In all G-8 countries, 15-year-old students who spoke the language of assessment, other official languages, or other national dialects at home most of the time scored higher in mathematics literacy than did their peers who spoke another language at home most of the time.

Children in the United States who speak languages other than English at home and who also have difficulty speaking English may face greater challenges progressing in school and in the labor market (Federal Interagency Forum on Child and Family Statistics 2005). Among the G-8 countries, the United States is not unique with respect to educating language minority students.

The 2003 Program for International Student Assessment (PISA 2003) distinguished between 15-year-old students who reported speaking the language of assessment, other official languages, or other national dialects at home most of the time and those who reported speaking another language at home most of the time. In

2003, 9 percent of U.S. students reported speaking another language at home most of the time (figure 9a). The U.S. percentage is higher than the corresponding percentages for France, the Russian Federation, Italy, and Japan (all 6 percent or less) and lower than the corresponding percentage for Canada (11 percent).

In all G-8 countries reporting data,⁹ 15-year-olds who spoke the language of assessment, other official languages, or other national dialects at home most of the time scored higher on the PISA 2003 combined mathematics literacy scale than did their peers who spoke another language at home most of the time (figure 9b). This difference ranged from 13 points in Canada to 90 points in Germany; in the United States, this difference was 46 points.

In the United States, 15-year-olds who spoke another language at home most of the time scored 444 on the combined mathematics literacy scale. This is measurably different from the corresponding score in one G-8 country—Canada. In Canada, students who spoke another language at home most of the time had a higher score (525) than their U.S. peers did.

Definitions and Methodology

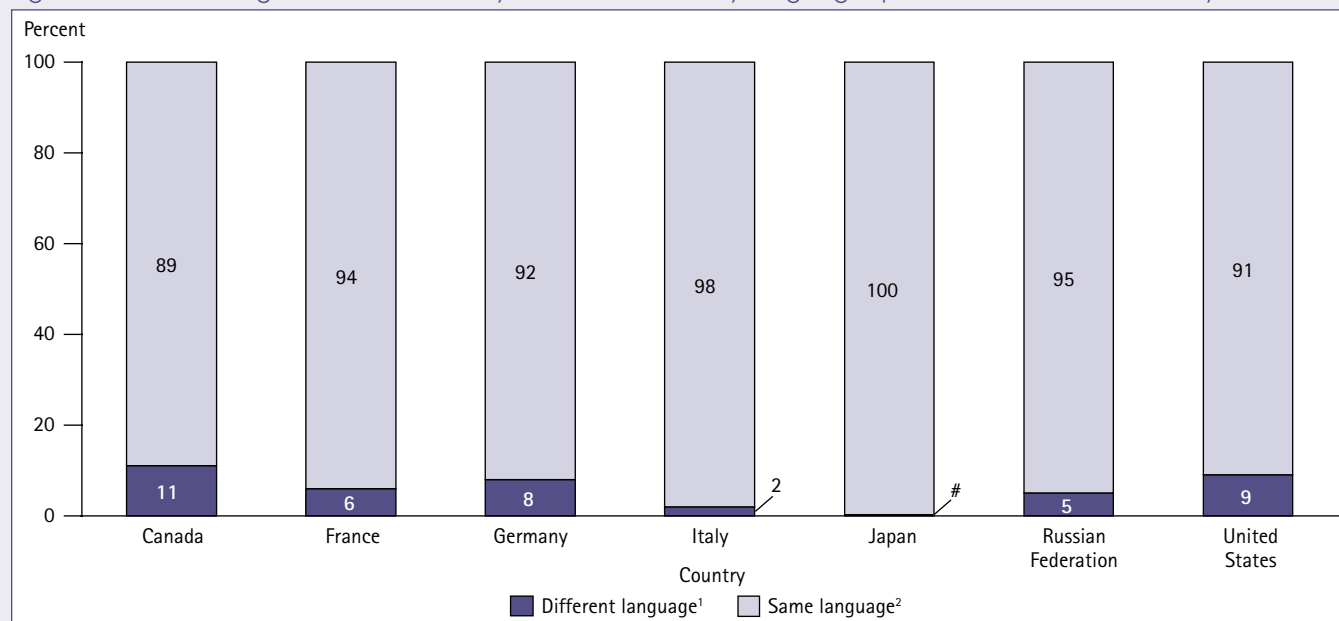
To facilitate the cross country comparison of achievement scores on the PISA 2003 combined mathematics literacy scale, an Organization for Economic Cooperation and Development (OECD) average was calculated whereby all the participating OECD countries contributed equally. The data were then standardized to set the OECD average at 500, with a range from 0 to 1000 and a standard deviation of 100. Since the individual country means were weighted averages of the student scores, this standardization implied that

about two-thirds of the students across all the participating OECD countries scored between 400 and 600. For more information about mathematics literacy in PISA 2003, see the Definitions and Methodology section of indicators 6 and 7.

Score-point differences presented in the text are computed from unrounded numbers; therefore, they may differ from computations made using the rounded whole numbers that appear in figure 9b.

⁹Due to low response rates, data for the United Kingdom are not shown in this indicator. In Italy and Japan, combined mathematics literacy scores are not shown for students whose language spoken at home most of the time is different from the language of assessment, other official languages, or other national dialects because there are too few cases to provide reliable estimates.

Figure 9a. Percentage distribution of 15-year-old students, by language spoken at home and country: 2003



#Rounds to zero.

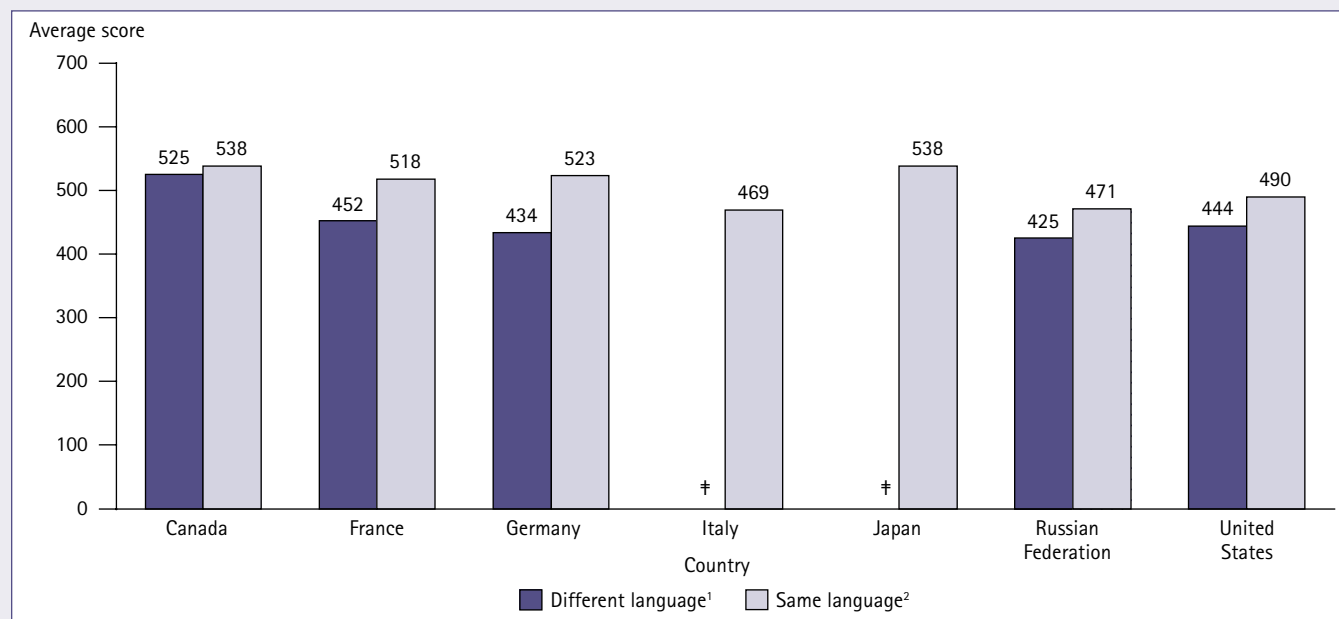
¹Language spoken at home most of the time is different from the language of assessment, other official languages, or other national dialects.

²Language spoken at home most of the time is the same as the language of assessment, other official languages, or other national dialects.

NOTE: Due to low response rates, data for the United Kingdom are not shown. Detail may not sum to totals because of rounding.

SOURCE: Organization for Economic Cooperation and Development (OECD). (2004). *Learning for Tomorrow's World: First Results From PISA 2003*, table 4.2g. Paris: Author.

Figure 9b. Combined mathematics literacy scores of 15-year-old students, by language spoken at home and country: 2003



#Reporting standards not met. Too few observations to provide reliable estimates.

¹Language spoken at home most of the time is different from the language of assessment, other official languages, or other national dialects.

²Language spoken at home most of the time is the same as the language of assessment, other official languages, or other national dialects.

NOTE: Due to low response rates, data for the United Kingdom are not shown.

SOURCE: Organization for Economic Cooperation and Development (OECD). (2004). *Learning for Tomorrow's World: First Results From PISA 2003*, table 4.2g. Paris: Author.

RELATIONSHIP BETWEEN READING AND MATHEMATICS ACHIEVEMENT

Key Findings: Canada, France, Germany, Italy, Japan, Russian Federation, United States

In all G-8 countries, 15-year-old students who scored low in either mathematics or reading tended to score lower than average in the other subject as well.

This indicator examines the extent to which students who perform poorly in reading are also likely to perform poorly in mathematics, and vice versa. Student performance can be evaluated not only by examining mean scores, but also by looking at the percentages of students who can accomplish tasks at particular proficiency levels. In the 2003 Program for International Student Assessment (PISA 2003), 15-year-old students' proficiency in reading literacy was defined in terms of five levels and their proficiency in mathematics literacy in terms of six levels. In this way, literacy skills were assessed along a continuum, with level 1 and below indicative of the lowest performing students. This indicator focuses on the reading performance of the lowest mathematics performers and the mathematics performance of the lowest reading performers. The results show that in all of the G-8 countries reporting data,¹⁰ 15-year-old students who scored low in either mathematics or reading tended to score lower than average in the other subject as well. The sections that follow describe the results separately for reading and mathematics, respectively.

In all of the G-8 countries, the average reading scores for students at level 1 or below in mathematics were lower than the respective country averages in reading (figure 10a). In fact, in the majority of the G-8 countries in 2003, the average reading scores of the lowest mathematics performers were at least 100 points lower (i.e., at least one standard deviation lower) than the respective country

averages in reading. In the United States, the average reading score of the lowest mathematics performers was 116 points lower than the average U.S. reading score (380 vs. 495).¹¹

Another way of evaluating the relationship between reading and mathematics achievement is to consider the percentage of students at level 1 or below in mathematics who are also at level 1 or below in reading, and vice versa. In all of the G-8 countries, at least one-half of the lowest mathematics performers were also among the lowest reading performers (with the United States at 62 percent) (figure 10b).

As noted, the mathematics performance of the lowest reading performers can also be examined. Similar to the results for reading, in all of the G-8 countries, the average mathematics scores for students at level 1 or below in reading were lower than the respective country averages in mathematics (figure 10a). Once again, in the majority of the G-8 countries, the lowest reading performers scored at least 100 points lower in mathematics compared to the respective country averages in mathematics. However, in Italy and the Russian Federation, which were the two lowest performing G-8 countries overall in mathematics, average mathematics scores were 93 points and 70 points lower, respectively, among the lowest reading performers. In Japan and Canada, the two highest performing G-8 countries overall in mathematics, average mathematics scores were about 130 points lower among the lowest reading performers.

The percentage of students at level 1 or below in reading who were also at level 1 or below in mathematics ranged from 61 percent in Japan to 82 percent in the United States, with the U.S. percentage higher than that of its G-8 peers (figure 10b).

Definitions and Methodology

To facilitate the cross country comparison of achievement scores on the PISA combined reading literacy scale and the combined mathematics literacy scale, an Organization for Economic Cooperation and Development (OECD) average was calculated whereby all the participating OECD countries contributed equally. The data were then standardized to set the OECD average on the reading scale and the mathematics scale at 500, with a range from 0 to 1000 and a standard deviation of 100. Since the individual country means were weighted averages of the student scores, this standardization implied that about two-thirds of the students across all the participating OECD countries scored between 400 and 600.

Proficiency in reading literacy and mathematics literacy was defined in terms of levels based on student performance scores on the combined scales for each subject area. Exact cut point scores in reading literacy are as follows: below level 1 (a score less than or equal to 334.75); level 1 (a score greater than 334.75 and less than or equal to 407.47); level 2 (a score greater than 407.47 and less than or equal to 480.18); level 3 (a score greater than 480.18 and

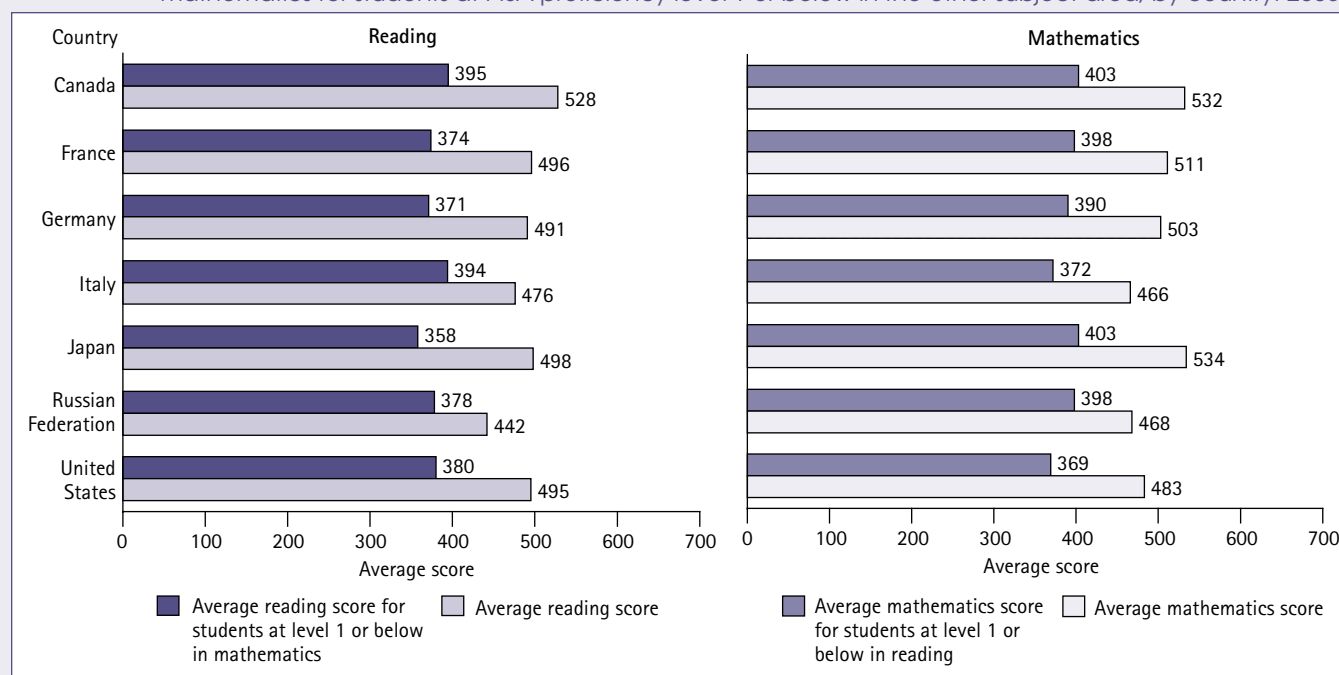
less than or equal to 552.89); level 4 (a score greater than 552.89 and less than or equal to 625.61); and level 5 (a score greater than 625.61). See the Definitions and Methodology section of indicator 6 for cut point scores in mathematics literacy. In order to reach a particular proficiency level, a student must have been able to answer correctly a majority of items at that level. In reading literacy, tasks at level 1 require students to locate single pieces of information with little or no competing information or draw simple inferences. On the other hand, tasks at level 5 require students to examine very complex texts, locate and organize multiple pieces of information, interpret language or apply unfamiliar categorization schemes, or evaluate and hypothesize about the information in the text. See the Definitions and Methodology section of indicator 6 for a description of the proficiency levels in mathematics literacy.

Score-point differences presented in the text are computed from unrounded numbers; therefore, they may differ from computations made using the rounded whole numbers that appear in figure 10a.

¹⁰Due to low response rates, data for the United Kingdom are not shown in this indicator.

¹¹Score-point difference was computed from unrounded numbers.

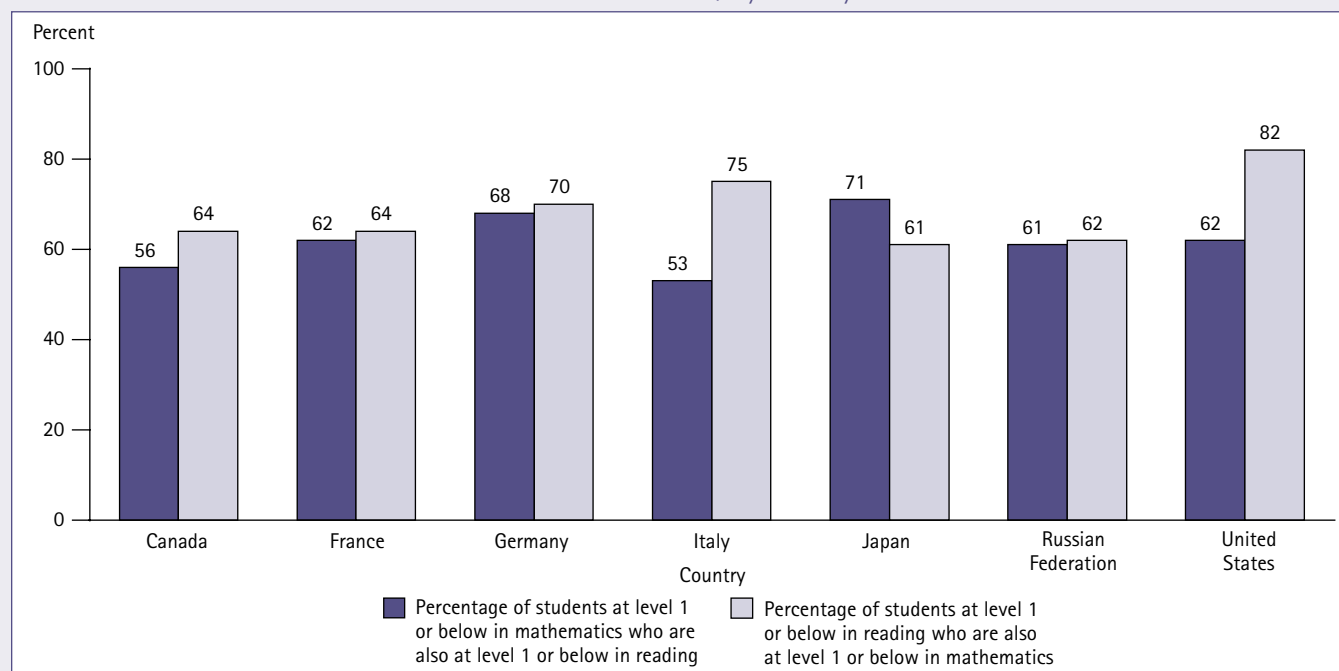
Figure 10a. Average scores of 15-year-old students in reading and mathematics, and average scores in reading and mathematics for students at PISA proficiency level 1 or below in the other subject area, by country: 2003



NOTE: In the Program for International Student Assessment (PISA), proficiency in reading literacy and mathematics literacy was defined in terms of levels based on student performance scores on the combined scales for each subject area. There were five levels for reading and six levels for mathematics. Students were classified into levels according to their scores. In this way, literacy skills were assessed along a continuum, with level 1 or below indicative of the lowest performing students. Due to low response rates, data for the United Kingdom are not shown.

SOURCE: Organization for Economic Cooperation and Development (OECD). (2004). *Learning for Tomorrow's World: First Results From PISA 2003*, tables 2.5c and 6.2. Paris: Author; OECD. (2006). *Education at a Glance: OECD Indicators 2006*, tables A6.2 and A6.3. Paris: Author; and OECD, PISA 2003, previously unpublished tabulations (June 2006).

Figure 10b. Percentage of 15-year-old students at PISA proficiency level 1 or below in mathematics who are also at level 1 or below in reading, and percentage of students at PISA proficiency level 1 or below in reading who are also at level 1 or below in mathematics, by country: 2003



NOTE: In the Program for International Student Assessment (PISA), proficiency in reading literacy and mathematics literacy was defined in terms of levels based on student performance scores on the combined scales for each subject area. There were five levels for reading and six levels for mathematics. Students were classified into levels according to their scores. In this way, literacy skills were assessed along a continuum, with level 1 or below indicative of the lowest performing students. Due to low response rates, data for the United Kingdom are not shown.

SOURCE: Organization for Economic Cooperation and Development (OECD). (2006). *Education at a Glance: OECD Indicators 2006*, tables A6.2 and A6.3. Paris: Author; and OECD, PISA 2003, previously unpublished tabulations (June 2006).

A warm, orange-toned photograph of a classroom. A female teacher stands on the left, smiling and pointing towards a whiteboard. Several students in the foreground have their hands raised, indicating an interactive lesson. The whiteboard in the background has some faint, illegible writing on it. The overall atmosphere is bright and positive.

INDICATORS PART III

Context for Learning

TIME SPENT ON MATHEMATICS LEARNING

Key Findings: Canada, France, Germany, Italy, Japan, Russian Federation, United States

On average, formal classroom instructional time per week on mathematics learning ranged from 3.0 hours in Germany to 3.7 hours in Canada and the United States. The number of instructional weeks per year ranged from 33.5 in Italy to 39.7 in Germany.

Using data from the student background questionnaire from the 2003 Program for International Student Assessment (PISA 2003), this indicator examines how much time students spend in mathematics learning in at-school and out-of-school settings. On average, formal classroom instructional time per week ranged from 3.0 hours in Germany to 3.7 hours in Canada and the United States (figure 11). U.S. students reported more formal classroom instructional hours per week than their French, Russian, and German peers did. Apart from hours spent in formal classroom settings, 15-year-olds in the United States spent about 30 minutes per week each in remedial and in enrichment classes (data not shown). Students from the Russian Federation reported spending close to 2 hours per week in remedial and enrichment classes combined.

Instruction in classroom settings at school, however, is only one aspect of student learning. Learning time in out-of-school activities ranged from 35 to 42 percent of students' total mathematics learning time in Japan, the United States, Canada, and France; it was 54 percent in the Russian Federation (computed from data in figure 11). U.S. 15-year-olds reported spending 2.8 hours per week on mathematics homework or other study set by teachers, less than that reported by their peers in Italy (3.5 hours per week) and the Russian Federation (5.0 hours per week).

Adding up the various time allocations, U.S. 15-year-olds reported spending 4.6 hours learning mathematics in at-school settings and 3.3 hours per week learning mathematics in out-of-school settings (computed from data in figure 11).

Since the data on instructional hours presented in this indicator refer to school weeks only, and countries differ in the number of weeks per year in which schools are open, data are also presented on the number of instructional weeks per year for six of the G-8 countries reporting data.¹² The number of instructional weeks per year ranged from 33.5 in Italy to 39.7 in Germany. In the United States, the number of instructional weeks per year was 36.0, which is more than in the Russian Federation and Italy, but less than in Canada, Japan, and Germany.

Definitions and Methodology

The 2003 Program for International Student Assessment (PISA 2003) asked 15-year-olds to report how much time they spent learning mathematics at school and outside of school.

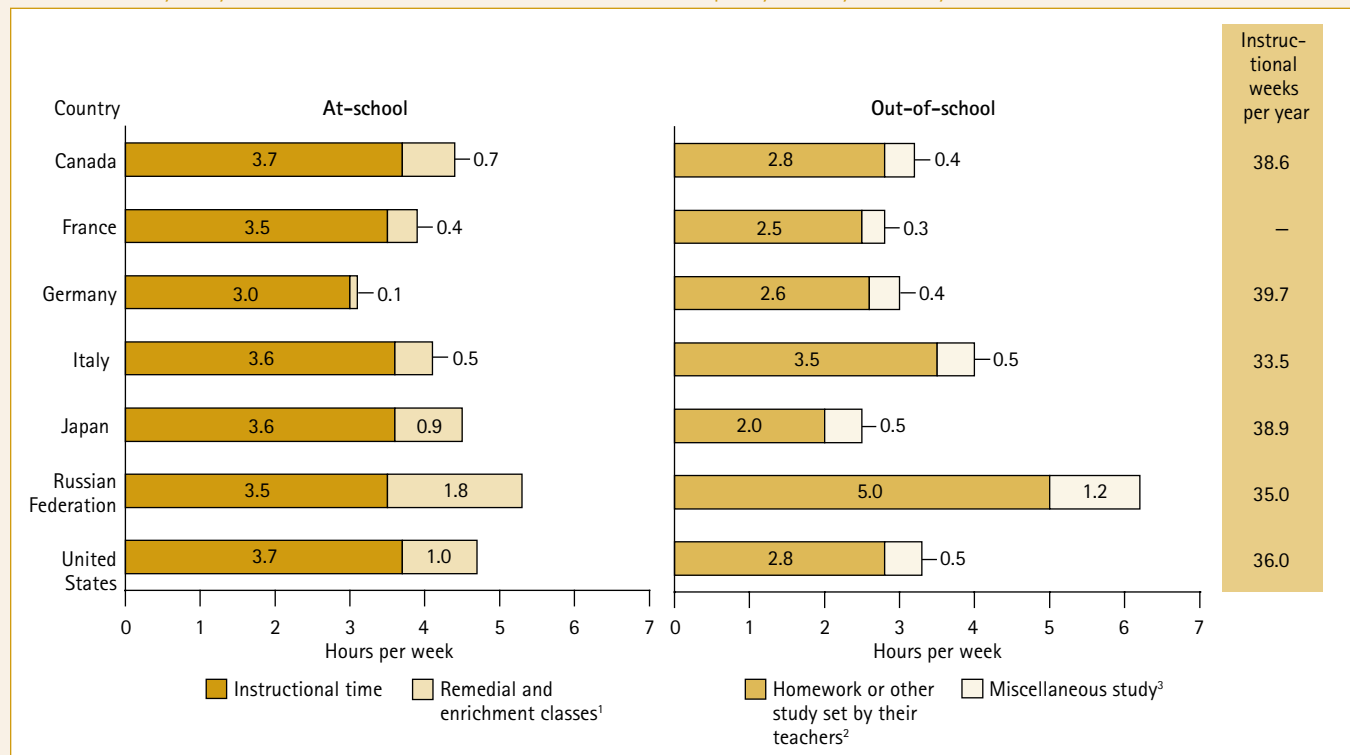
At-school time included (a) formal instructional time in the classroom (calculated by multiplying the average length of a class period reported in minutes by the number of class periods receiving mathematics instruction per week), (b) number of hours spent each week on remedial classes, and (c) number of hours spent each week on enrichment classes.

Out-of-school activities included number of hours spent each week on (a) homework or other study set by the mathematics teacher, (b) working with a mathematics tutor, (c) attending out-of-school mathematics classes, and (d) other mathematics activities (e.g., mathematics competitions and mathematics clubs) (out-of-school activities b, c, and d are grouped as miscellaneous study in figure 11).

The computations presented in the text are carried out using unrounded numbers; therefore, they may differ from computations made using the rounded numbers that appear in figure 11.

¹²Data on instructional weeks per year are not available for France. Due to low response rates, data for the United Kingdom are not shown at all in this indicator.

Figure 11. Average hours spent per week on mathematics learning in at-school and out-of-school settings as reported by 15-year-old students, and instructional weeks per year, by country: 2003



—Not available.

¹Some item response rates by country are below 85 percent, with a range from 72 to 88 percent. For the composite variable (i.e., remedial and enrichment classes together as a single variable), response rates range from 70 to 83 percent across countries. Missing data have not been explicitly accounted for in the data.

²Item response rate for Canada is below 85 percent (i.e., 82 percent), and missing data have not been explicitly accounted for in the data.

³Some item response rates by country are below 85 percent, with a range from 69 to 90 percent. For the composite variable (i.e., miscellaneous study as a single variable; see general note below for the out-of-school activities that this consists of), response rates range from 66 to 88 percent across countries. Missing data have not been explicitly accounted for in the data.

NOTE: Miscellaneous study reported under out-of-school activities combines (1) working with a mathematics tutor, (2) attending out-of-school mathematics classes, and (3) other mathematics activities (e.g., mathematics competitions and mathematics clubs).

SOURCE: Organization for Economic Cooperation and Development (OECD). (2004). *Learning for Tomorrow's World, First Results From PISA 2003*, table 5.14. Paris: Author.

CLASS SIZE AND RATIO OF STUDENTS TO TEACHING STAFF

Key Findings: France, Germany, Italy, Japan, Russian Federation, United Kingdom, United States

The U.S. student/teacher ratio at the primary level (15) was lower than the ratio in all but one of the G-8 countries. At the secondary level, student/teacher ratios ranged from 10 in the Russian Federation to 16 in the United States.

The issue of class size has received a great deal of attention in U.S. education policy, since it is commonly looked upon as a factor influencing the interaction between teachers and students. While smaller classes are generally valued because they may allow students to receive more individual attention from their teachers, evidence on the effects of variation in class size upon student performance is mixed (OECD 2006a). One factor that confounds the association between class size and student performance is the ratio of students to teaching staff. Unlike measures of class size, the ratio of students to teaching staff accounts for teaching staff in addition to classroom teachers, such as teachers who may be developing curriculum or have other indirect instructional roles. Hence, it is useful to jointly examine both class size and the student/teacher ratio as indicators of the resources devoted to education.

Figure 12a shows average class size in primary education for seven G-8 countries reporting data. In 2004, two countries had an average class size of less than 20 students—the Russian Federation (16 students) and Italy (18 students). Four countries had an average class size between 20 and 25 students—Germany, with 22 students;

France and the United States, both with 23 students; and the United Kingdom, with 24 students. Japan had the largest average class size in primary education, with 29 students.

Figure 12b shows the ratio of students to teaching staff for the G-8 countries, broken down by four levels of education: preprimary, primary, secondary (lower and upper secondary combined), and higher education. In the United States, student/teacher ratios were fairly consistent across education levels. In other countries, such as Japan, ratios tended to be higher at the lower education levels, but lower at the higher levels. On the other hand, in Italy, lower ratios were observed at the lower education levels, with a sharp increase at the higher education level. Specifically, in 2004, the U.S. student/teacher ratio at the preprimary level was 14, which was higher than the corresponding ratios in Italy (12) and the Russian Federation (7), but lower than those in the United Kingdom (18), Japan (18), and France (19). At the primary level, the student/teacher ratio in the United States was 15, which was higher than the corresponding ratio in Italy (11), but lower than those in the other G-8 countries (with ratios ranging from 17 to 21). At the secondary level, student/teacher ratios ranged from 10 in the Russian Federation to 16 in the United States. Finally, at the higher education level, the student/teacher ratio in the United States was 16, which was higher than the corresponding ratios in the Russian Federation (13), Germany (13), and Japan (11), but lower than those in the United Kingdom (18), France (18), and Italy (22).

Definition and Methodology

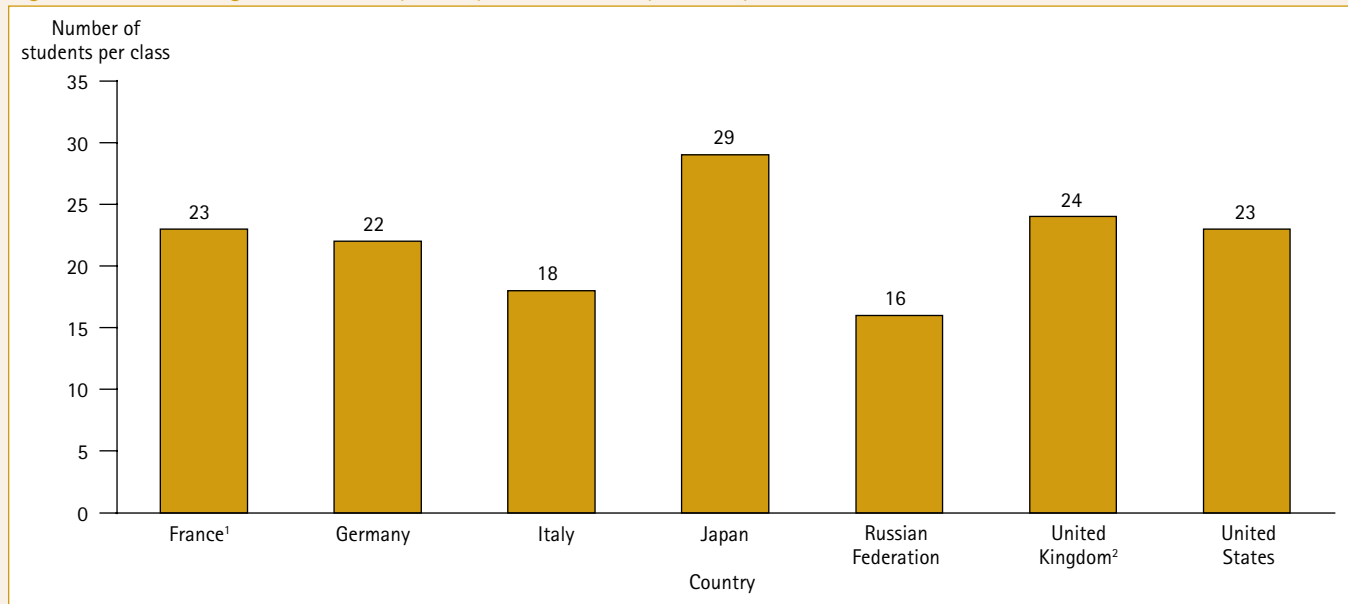
Average class size is calculated by dividing the number of students enrolled by the number of classes. Average class size refers to the division of students who are following a common course of study, based on the highest number of common courses (usually compulsory studies), and excludes teaching in subgroups outside the regular classroom setting. In order to ensure comparability among countries, the data include only regular programs at the primary level of education; special-needs programs have been excluded from the calculation.

Data on average class size are not available for the education levels of preprimary, lower and upper secondary combined, and higher education, and thus are not shown in this indicator as is done for the ratio of students to teaching staff.

The ratio of students to teaching staff is calculated by dividing the number of full-time-equivalent students at a given level of education by the number of full-time-equivalent teachers at that level. Teaching staff refers to professional personnel directly involved in teaching students. This includes classroom teachers; special education teachers; and other teachers who work with a whole class of students in a classroom, in small groups in a resource room, or in one-to-one teaching situations inside or outside a regular classroom. Teaching staff also includes department chairpersons whose duties include some teaching, but excludes paraprofessional personnel who support teachers in providing instruction to students, such as teacher aides.

As shown in the figures, education levels are defined according to the International Standard Classification of Education (ISCED). For more information on the ISCED levels, see appendix A.

Figure 12a. Average class size in primary education, by country: 2004



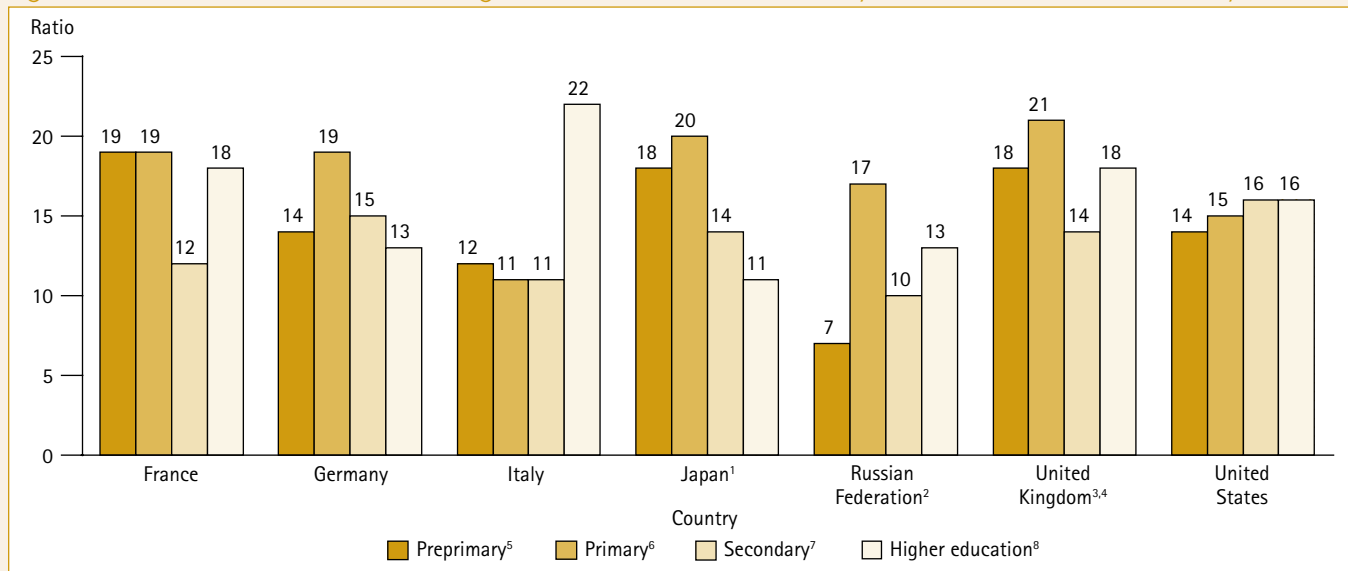
¹Reference year is 2003 rather than 2004.

²The United Kingdom includes England, Northern Ireland, Scotland, and Wales.

NOTE: Data shown include public and private institutions, with calculations based on number of students and number of classes. In order to ensure comparability among countries, the data include only regular programs at the primary level of education; special needs programs have been excluded from the calculation. Education levels are defined according to the International Standard Classification of Education (ISCED). Primary education refers to ISCED level 1. For more information on the ISCED levels, see appendix A in this report.

SOURCE: Organization for Economic Cooperation and Development (OECD). (2005). *Education at a Glance: OECD Indicators 2005*, table D2.1. Paris: Author; and OECD. (2006). *Education at a Glance: OECD Indicators 2006*, table D2.1. Paris: Author.

Figure 12b. Ratio of students to teaching staff in education institutions, by level of education and country: 2004



¹In Japan, the ratio of students to teaching staff at the secondary level and the higher education level include postsecondary nontertiary education data (ISCED level 4), as some ISCED level 4 teachers are included in ISCED level 3, while some others are included in ISCED level 5.

²Reference year for preprimary education is 2003 rather than 2004.

³Includes only general programs in upper secondary education.

⁴The United Kingdom includes England, Northern Ireland, Scotland, and Wales.

⁵Includes ISCED level 0 (preprimary education).

⁶Includes ISCED level 1 (primary education).

⁷Includes ISCED levels 2 (lower secondary education) and 3 (upper secondary education). In Japan, the Russian Federation, and the United Kingdom, ISCED level 4 (postsecondary nontertiary education) data are also included.

⁸Includes ISCED levels 5A (academic higher education below the doctoral level), 5B (vocational higher education), and 6 (doctoral level of academic higher education). In Japan, ISCED level 4 (postsecondary nontertiary education) data are also included.

NOTE: Data shown include public and private institutions, with calculations based on full-time equivalents. Education levels are defined according to the International Standard Classification of Education (ISCED). For more information on the ISCED levels, see appendix A in this report.

SOURCE: Organization for Economic Cooperation and Development (OECD). (2005). *Education at a Glance: OECD Indicators 2005*, table D2.2. Paris: Author; and OECD. (2006). *Education at a Glance: OECD Indicators 2006*, table D2.2. Paris: Author.

TEACHER PROFESSIONAL DEVELOPMENT IN MATHEMATICS AND SCIENCE

Key Findings: Italy, Japan, Russian Federation, United Kingdom (England and Scotland only),¹³ United States

About two-thirds of U.S. fourth-graders had teachers who reported participating in professional development pertaining to mathematics content. Teacher participation in this area was lower in Italy, Japan, and Scotland.

The 2003 Trends in International Mathematics and Science Study (TIMSS 2003) asked teachers of fourth- and eighth-graders to report on their professional development participation in several areas in the 2 years before the assessment. This indicator discusses the results for teachers of fourth-graders in four areas: content, pedagogy/instruction, improving students' critical thinking or problem-solving skills, and assessment. (Teachers reported participation separately for mathematics and science.) The results show considerable variation by area of professional development, subject area, and country.

In 2003, about two-thirds of U.S. fourth-graders had teachers who reported participating in professional development pertaining to mathematics content in the previous 2 years (figure 13). Teacher participation in this area was lower in Italy, Japan, and Scotland (ranging from 29 to 42 percent), but higher in England (76 percent). At least half of the fourth-graders in England, the Russian Federation, and the United States had teachers who reported participating in the other three areas of professional development in mathematics.

The percentage of fourth-graders whose teachers reported participating in professional development pertaining to mathematics pedagogy/instruction ranged from 30 percent in Italy to 88 percent in England, with the United States at 54 percent. In mathematics, more fourth-graders in the United States than in Scotland, Japan, and Italy had teachers who reported participating in professional development in the area of improving students' critical thinking or problem-solving skills and in the area of assessment. However,

a greater percentage of students in England than in the United States had teachers who reported participating in professional development in the area of improving students' critical thinking or problem-solving skills in mathematics (72 vs. 58 percent).

In England, Italy, and the United States, there was generally more reported participation in professional development in mathematics than in science in each of the four areas, with one exception (in Italy, no statistically significant difference was detected in the area of content). Across all four areas, no G-8 country reporting data had more fourth-graders with teachers reporting professional development participation in science than in mathematics.

The percentage of fourth-graders in England, the Russian Federation, and the United States whose teachers reported participating in professional development in science ranged from 30 percent in England in assessment to 51 percent in the Russian Federation in pedagogy/instruction. In Italy, the percentage of fourth-graders whose teachers reported participating in professional development in science was 22 percent or less in all four areas.

The percentage of fourth-graders whose teachers reported participating in professional development pertaining to science pedagogy/instruction ranged from 15 percent in Italy to 51 percent in the Russian Federation, with the United States at 38 percent. In science as in mathematics, more fourth-graders in the United States than in Scotland, Japan, and Italy had teachers who reported participating in professional development in the area of improving students' critical thinking or problem-solving skills and in the area of assessment. However, a greater percentage of students in the Russian Federation than in the United States had teachers who reported participating in professional development in the area of science assessment (45 vs. 34 percent).

Definitions and Methodology

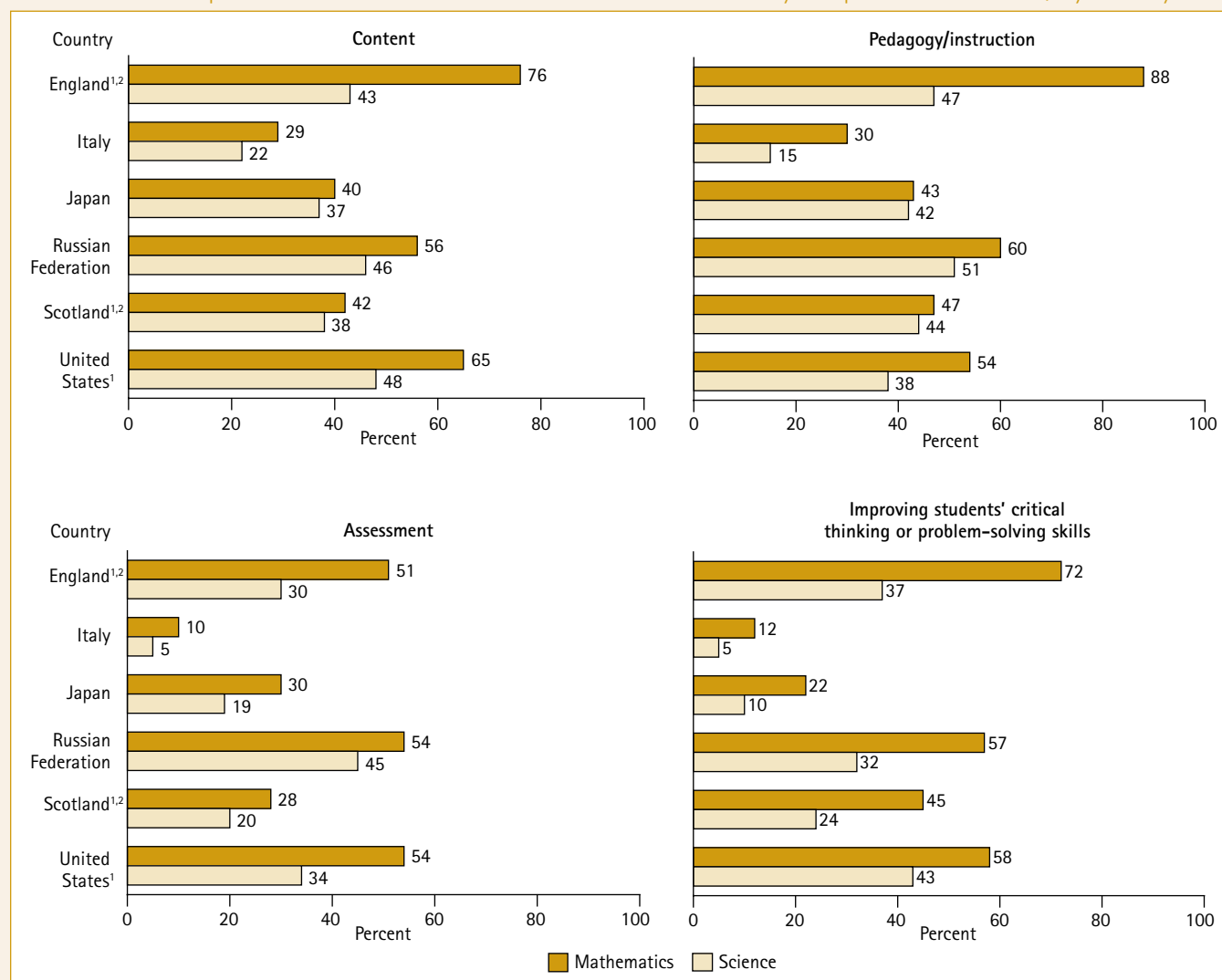
Data for this indicator are from the TIMSS 2003 fourth-grade teacher questionnaire, which was designed to obtain information about the classroom contexts for the teaching and learning of mathematics and science, and about the implemented curriculum in these subjects. For each participating school at the fourth grade, one teacher questionnaire was administered to the classroom teacher of the sampled fourth-grade class. The TIMSS 2003 fourth-grade

teachers do not constitute representative samples of teachers. Rather, they are the teachers for nationally representative samples of fourth-grade students. Thus, the teacher data presented in this indicator were analyzed at the student level.

Countries were required to sample students in the upper of the two grades that contained the largest number of 9-year-olds. In the United States and most countries, this corresponds to grade 4.

¹³In the data source for this indicator (TIMSS 2003), the United Kingdom is represented separately by two of its component jurisdictions, England and Scotland. Northern Ireland and Wales did not participate in this study.

Figure 13. Percentage of fourth-grade students whose teachers reported that they participated in various professional development activities in mathematics and science in the 2 years prior to assessment, by country: 2003



¹Met international guidelines for participation rates in 2003 only after replacement schools were included. That is, to avoid sample size losses resulting from sampled schools not participating, a mechanism was instituted to identify, a priori, replacement schools that have similar characteristics to the sampled schools that they may replace.

²Data are available for at least 70 percent, but less than 85 percent, of the students. Missing data have not been explicitly accounted for in the data.

SOURCE: Martin, M.O., Mullis, I.V.S., Gonzalez, E.J., and Chrostowski, S.J. (2004). *TIMSS 2003 International Science Report: Findings From IEA's Trends in International Mathematics and Science Study at the Fourth and Eighth Grades*, exhibit 6.8. Chestnut Hill, MA: Boston College; and Mullis, I.V.S., Martin, M.O., Gonzalez, E.J., and Chrostowski, S.J. (2004). *TIMSS 2003 International Mathematics Report: Findings From IEA's Trends in International Mathematics and Science Study at the Fourth and Eighth Grades*, exhibit 6.7. Chestnut Hill, MA: Boston College.

SCHOOL PRINCIPALS' USES FOR ASSESSMENTS

Key Findings: Canada, Germany, Italy, Japan, Russian Federation, United States

A greater percentage of U.S. students than their peers in all other G-8 countries had principals who reported that they used assessment results to compare their school's performance to district- or national-level performance.

Results from assessments can be used for many purposes, and there is considerable debate as to what the best uses may be (Phye 1997; OECD 2004). The 2003 Program for International Student Assessment (PISA 2003) asked school principals to report whether or not they have used assessment results for various purposes.

In 2003, principals across the G-8 countries very frequently reported using assessment results to inform parents about their child's progress. In all of the G-8 countries reporting data,¹⁴ at least 96 percent of 15-year-olds had principals who reported that they used assessment results for this purpose (figure 14). Similarly, principals frequently cited using assessment results to make decisions about students' retention or promotion. In all G-8 countries, at least three-quarters of the students had principals who reported that they used assessment results for this purpose. In the United States, however, this percentage was lower than the corresponding percentages for Japan, Canada, Germany, and the Russian Federation—76 percent in the United States compared to a range from 90 to 97 percent. In all but one of the G-8 countries, at least three-quarters of the students had principals who reported that they used assessment results to identify aspects of instruction or the curriculum that could be improved. (The exception was Germany, at 45 percent.) In the United States, the percentage was 92 percent.

On the other hand, the percentage of 15-year-olds with principals who reported using assessment results to group students for instructional purposes ranged from 36 percent in Germany to 72 percent in Canada; in the United States, the percentage was 66 percent.

There was also considerable variation across G-8 countries in principals' reports pertaining to several other assessment purposes. For example, a greater percentage of U.S. 15-year-old students than their peers in all other G-8 countries in 2003 had principals who reported using assessment results to compare their school's performance to district- or national-level performance. This frequency ranged from about 2 out of 10 students in Germany and Japan, 3 out of 10 students in Italy, and 7 out of 10 students in Canada and the Russian Federation to 9 out of 10 students in the United States. Similarly, a greater percentage of U.S. students than their peers in four other G-8 countries had principals who reported using assessment results to compare their school with other schools (80 percent in the United States vs. 53 percent in Canada, 29 percent in Italy, 17 percent in Germany, and 12 percent in Japan). Assessment results were also more likely to be used in the United States than in the same four G-8 countries to monitor schools' progress from year to year (93 percent of students in the United States had principals reporting this compared to a range from 44 to 79 percent).

In the United States, the assessment purpose least frequently cited was making judgments about teachers' effectiveness (55 percent of students had principals reporting this). Compared to the United States, a greater percentage of students in Japan and the Russian Federation (82 and 99 percent, respectively) and a smaller percentage in Canada, Italy, and Germany (31, 23, and 12 percent, respectively) had principals who reported that they used assessment results for this purpose.

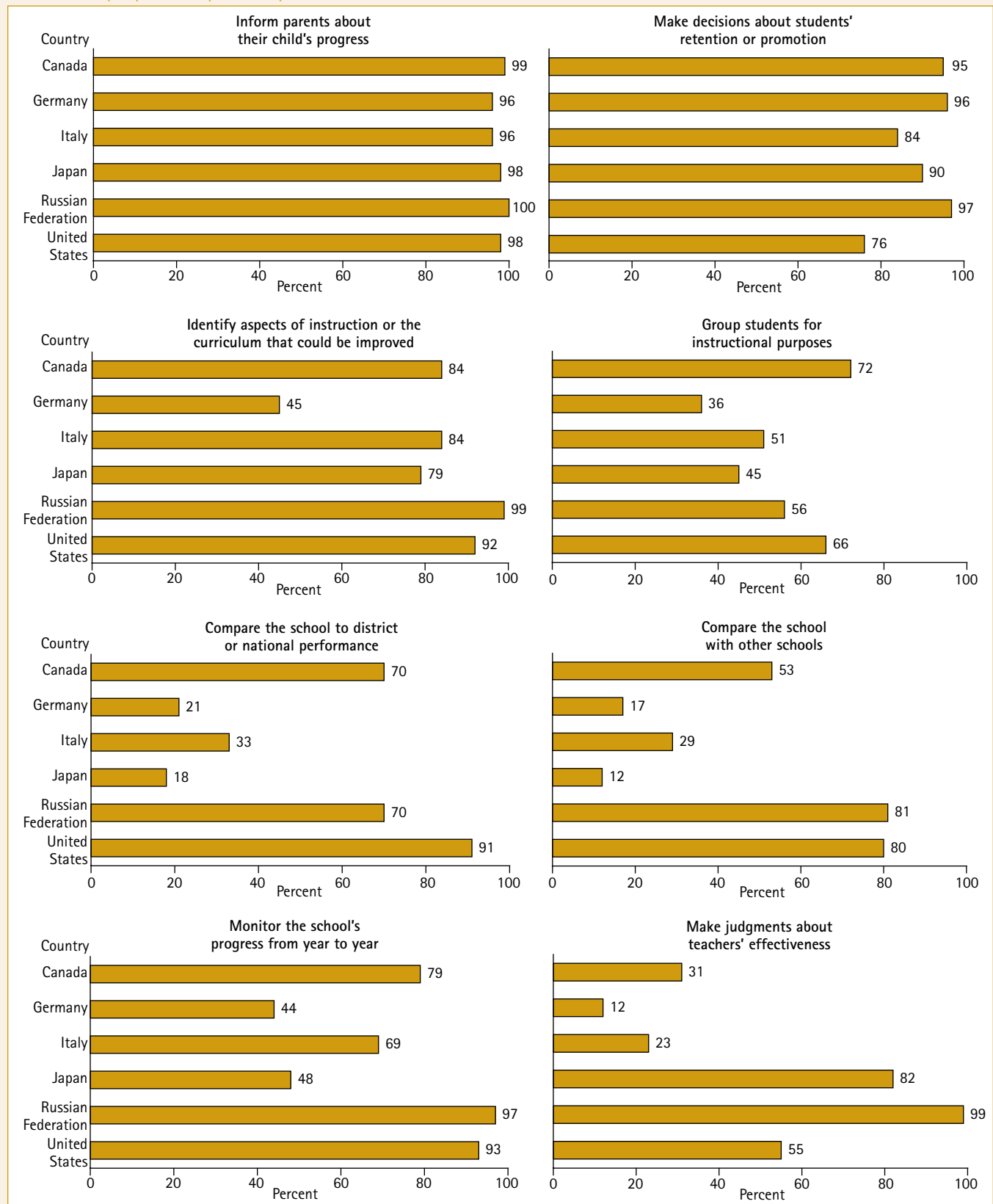
Definitions and Methodology

Data for this indicator are from the PISA 2003 school questionnaire, which was designed to obtain information about a variety of school-related aspects, including school characteristics, the school's resources, the student body, teachers in the school, pedagogical practices of the school, and administrative structures within the school. At all schools with participating 15-year-old students, a

school questionnaire was administered to the principal. The PISA 2003 principals do not constitute representative samples of principals. Rather, they are the principals for nationally representative samples of 15-year-old students. Thus, the school data presented in this indicator were analyzed at the student level.

¹⁴Data for France have been withdrawn at the request of the country and thus are not shown in this indicator. Due to low response rates, data for the United Kingdom are also not shown here.

Figure 14. Percentage of 15-year-old students whose principals reported that they used assessment results for various purposes, by country: 2003



NOTE: For the United States, item response rates across the purposes of assessment are at least 84 percent; for all other countries shown, item response rates are at least 85 percent. Missing data have not been explicitly accounted for in the data. Data for France have been withdrawn at the request of the country and thus are not shown here. Due to low response rates, data for the United Kingdom are not shown.

SOURCE: Organization for Economic Cooperation and Development (OECD), Program for International Student Assessment (PISA), 2003.



INDICATORS PART IV

Expenditure for Education

PUBLIC SCHOOL TEACHERS' SALARIES

Key Findings: England, France, Germany, Italy, Japan, Scotland, United States

The United States paid the second highest average starting salary to public school teachers at both the primary and upper secondary levels with minimum training. Only Germany reported a higher average starting salary for teachers at these education levels with minimum training.

International comparisons of public school teachers' salaries can be used to examine how teacher compensation varies across countries. This indicator presents a cross-country comparison of the average salaries of teachers at two points in their careers: (1) starting salaries of full-time teachers with the minimum training necessary to be fully qualified at the beginning of their teaching careers and (2) average salaries of full-time teachers with the minimum training necessary to be fully qualified plus 15 years of experience. Comparisons are presented across two education levels: primary and upper secondary. The indicator also compares the ratio of these average salaries to the gross domestic product (GDP) per capita for each of the reporting countries; this ratio provides a proxy measure of teacher earnings relative to the earnings of the country's average paid employee.

Of the seven G-8 countries reporting data in 2004, the United States paid the second highest average starting salary to public school teachers at both the primary and upper secondary levels

with minimum training (roughly \$32,000) (figure 15). Only Germany reported a higher average starting salary for teachers at these two education levels with minimum training. In most G-8 countries in 2004, public school teachers at both education levels with minimum training earned less than the average GDP per capita in their respective countries (table 4). For example, in the United States, the GDP per capita was about \$39,700, and the average starting salary of public primary and upper secondary school teachers with minimum training was about 80 percent of the U.S. GDP per capita. In Germany, however, public primary and upper secondary school teachers with minimum training earned 131 and 147 percent, respectively, of the German GDP per capita.

The United States paid the third lowest average salary to public primary and upper secondary school teachers with minimum training plus 15 years of experience (about \$40,000) (figure 15). Compared to the United States, England, Scotland, Japan, and Germany reported higher average salaries for public primary and upper secondary school teachers with minimum training plus 15 years of experience. In all of the G-8 countries, public school teachers at both education levels with minimum training plus 15 years of experience earned at least as much as the average GDP per capita in their respective countries (table 4).

Definitions and Methodology

Teacher salary data are from the 2005 Organization for Economic Cooperation and Development (OECD) Indicators of National Education Systems (INES) Survey on Teachers and the Curriculum and are for school year 2003–04. Data for GDP per capita are for calendar year 2004. Dollar figures for teacher salaries and GDP per capita were converted to U.S. equivalent dollars using purchasing power parities (PPPs), which equalize the purchasing power of different currencies. PPP exchange rate data are from the 2003–04 OECD National Accounts Database (OECD 2006b). Using PPPs to convert all teacher salary data to U.S. equivalent dollars allows for cost of living differences across countries to be taken into account.

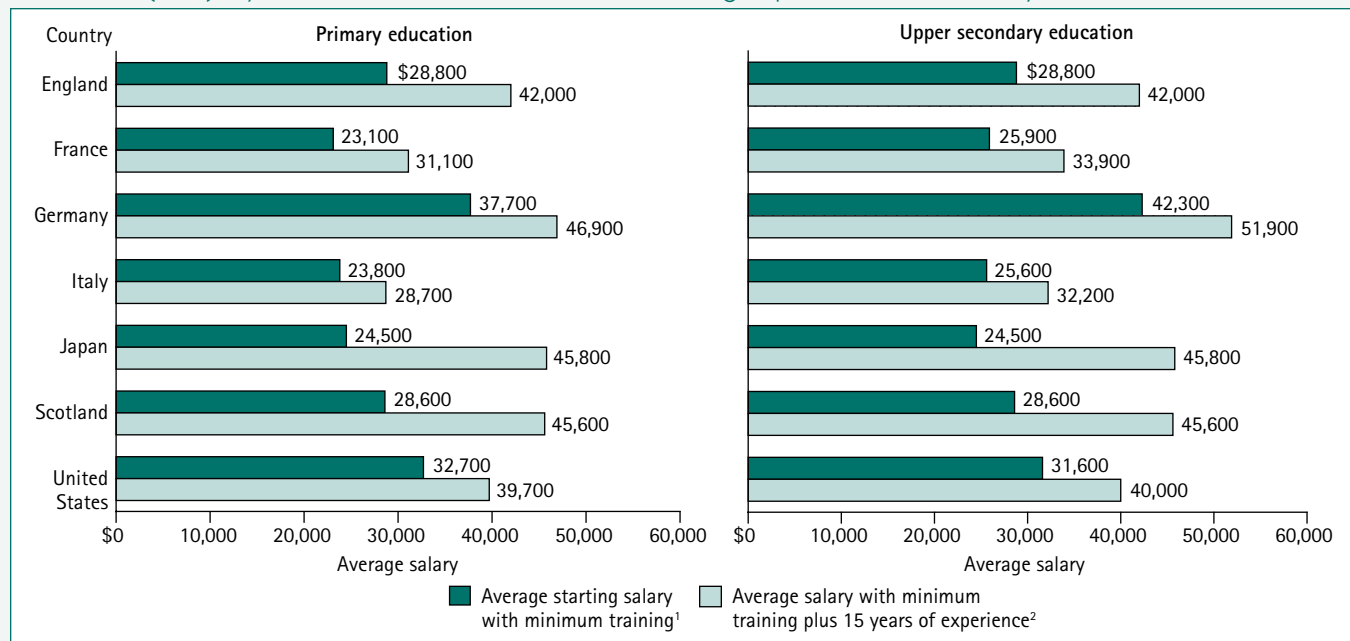
Salaries refer to scheduled salaries according to official pay scales, and are defined as before-tax, or gross, salaries (the total sum paid by the employer for the labor supplied), excluding the employer's contribution to social security and pension (according to existing salary scales).

Countries with centralized systems of education typically have national salary schedules. In countries like the United States, with decentralized education systems, local or regional governments establish their own salary schedules. The national averages shown here do not represent the within-country variation that exists in teacher salaries.

While this indicator compares public school teachers with the minimum training necessary to be fully qualified and those with the minimum training necessary to be fully qualified plus 15 years of experience, there may be considerable variation across countries in the percentage of teachers who meet these definitions. Furthermore, the minimum training necessary to be fully qualified varies by country. In the United States, teacher training is decentralized and varies by state.

As shown in the figure and table, education levels are defined according to the International Standard Classification of Education (ISCED). For more information on the ISCED levels, see appendix A.

Figure 15. Public school teachers' average annual salaries in U.S. dollars converted using purchasing power parities (PPPs), by education level, level of teacher training/experience, and country: 2004



¹Refers to the average scheduled annual salary of a full-time teacher with the minimum training necessary to be fully qualified at the beginning of the teaching career.

²Refers to the average scheduled annual salary of a full-time teacher with the minimum training necessary to be fully qualified plus 15 years of experience.

NOTE: Education levels are defined according to the International Standard Classification of Education (ISCED). Primary education refers to ISCED level 1. Upper secondary education refers to ISCED level 3. For more information on the ISCED levels, see appendix A in this report. Average salaries are gross salaries (i.e., before deductions for income taxes) for school year 2003–04 and are converted to U.S. dollars using 2003–04 national purchasing power parities (PPPs) exchange rate data.

SOURCE: Organization for Economic Cooperation and Development (OECD). (2006). *Education at a Glance: OECD Indicators 2006*, table D3.1. Paris: Author.

Table 4. Public school teachers' average annual salaries in U.S. dollars converted using purchasing power parities (PPPs) expressed as a ratio of gross domestic product (GDP) per capita in U.S. dollars, by education level, level of teacher training/experience, and country: 2004

Country	Average starting salary with minimum training ¹ expressed as a ratio of GDP per capita		Average salary with minimum training plus 15 years of experience ² expressed as a ratio of GDP per capita		GDP per capita
	Primary	Upper secondary	Primary	Upper secondary	
England ³	0.93	0.93	1.36	1.36	\$30,800
France	0.80	0.89	1.07	1.17	29,000
Germany	1.31	1.47	1.63	1.80	28,800
Italy	0.87	0.94	1.05	1.18	27,300
Japan	0.83	0.83	1.55	1.55	29,600
Scotland ³	0.93	0.93	1.48	1.48	30,800
United States	0.82	0.79	1.00	1.01	39,700

¹Refers to the average scheduled annual salary of a full-time teacher with the minimum training necessary to be fully qualified at the beginning of the teaching career.

²Refers to the average scheduled annual salary of a full-time teacher with the minimum training necessary to be fully qualified plus 15 years of experience.

³Data on GDP per capita refer to the United Kingdom.

NOTE: Education levels are defined according to the International Standard Classification of Education (ISCED). Primary education refers to ISCED level 1. Upper secondary education refers to ISCED level 3. For more information on the ISCED levels, see appendix A in this report. Average salaries are gross salaries (i.e., before deductions for income taxes) for school year 2003–04 and are converted to U.S. dollars using 2003–04 national purchasing power parities (PPPs) exchange rate data. GDP per capita in national currencies (2004) has been calculated from total population and total GDP, and has been converted to US dollars using PPPs for GDP.

SOURCE: Organization for Economic Cooperation and Development (OECD). (2006). *Education at a Glance: OECD Indicators 2006*, table D3.1 and web table X2.6b. Paris: Author. Retrieved November 1, 2006, from <http://www.oecd.org/dataoecd/45/55/37370984.xls>.

EXPENDITURE FOR EDUCATION

Key Findings: France, Germany, Italy, Japan, United Kingdom, United States

The United States ranked the highest among the G-8 countries in terms of expenditure per student at the combined primary and secondary education levels as well as at the higher education level.

Two measures used to compare countries' investment in education are expenditure per student (expressed in absolute terms) from both public and private sources and total expenditure as a percentage of gross domestic product (GDP). The latter measure allows a comparison of countries' expenditure relative to their ability to finance education.

In 2003, expenditure per student for the United States was about \$8,900 at the combined primary and secondary education levels and about \$24,100 at the higher education level (figure 16a). Both of these figures were higher than the corresponding figures for the five other G-8 countries reporting data, which ranged from about \$6,500 in Germany to \$7,700 in Italy at the combined primary and

secondary levels and from about \$8,800 in Italy to \$11,900 in the United Kingdom at the higher education level.

As previously noted, all of the G-8 countries spent more per student at the higher education level than at the combined primary and secondary education levels. However, as shown in figure 16b, all of the G-8 countries spent more money (i.e., in total dollars as a percentage of GDP) at the combined primary and secondary education levels than at the higher education level, where student enrollment is much lower. The United States spent 4.1 percent of its GDP on primary and secondary education, higher than the share of GDP spent on education at this level in Italy, Germany, and Japan. At the higher education level, the United States spent 2.9 percent of its GDP on education, higher than the percentage of GDP spent on education at this level than in any of the other G-8 countries.

Considering education expenditure at all levels combined, the United States spent a higher percentage of its GDP on education (7 percent) than did any of the other G-8 countries.

Definitions and Methodology

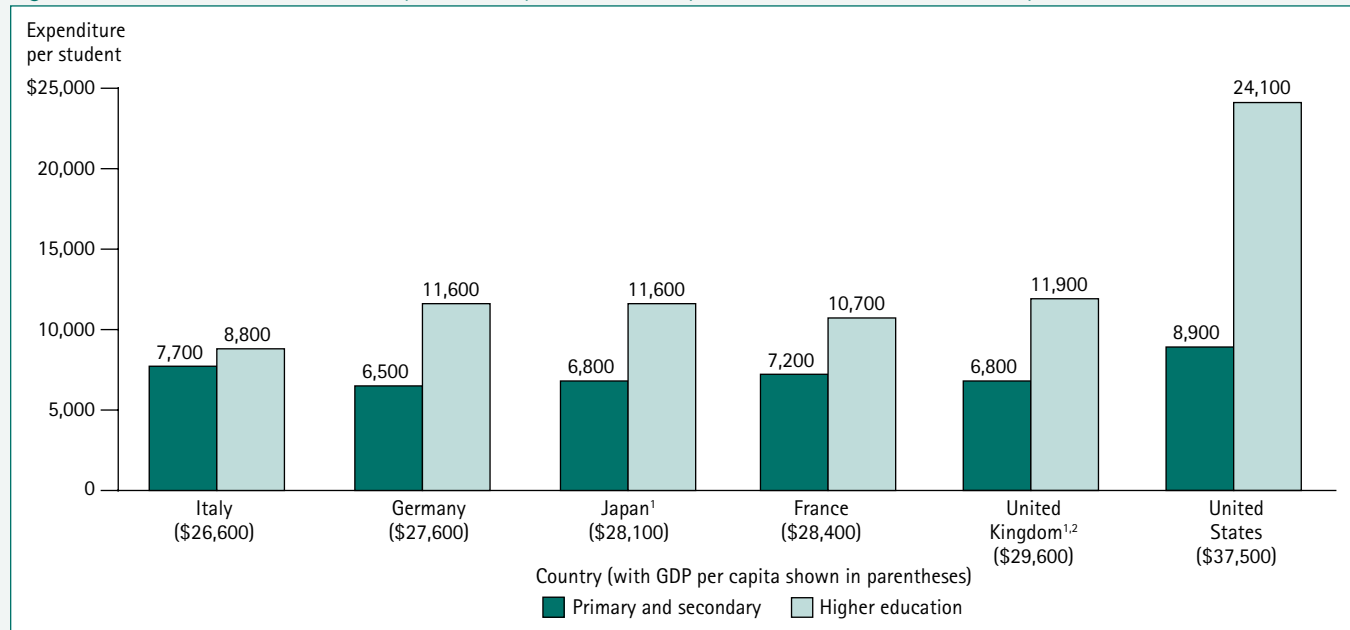
Per student expenditure is based on public and private full-time-equivalent (FTE) enrollment figures for the 2002–03 school year and current expenditure and capital outlays from both public and private sources, where data are available. Data for GDP per capita are for calendar year 2003. Dollar figures for education expenditure and GDP per capita were converted to U.S. equivalent dollars using purchasing power parities (PPPs), which equalize the purchasing power of different currencies. Using PPPs to convert all education expenditure data to US equivalent dollars allows for cost of living differences across countries to be taken into account. Within-

country consumer price indices are used to adjust the PPP indices to account for inflation because the fiscal year has a different starting date in different countries.

The national averages shown here do not represent the within-country variation that may exist in the annual education expenditure per student.

As shown in the figures, education levels are defined according to the International Standard Classification of Education (ISCED). For more information on the ISCED levels, see appendix A.

Figure 16a. Annual education expenditure per student, by education level and country: 2003



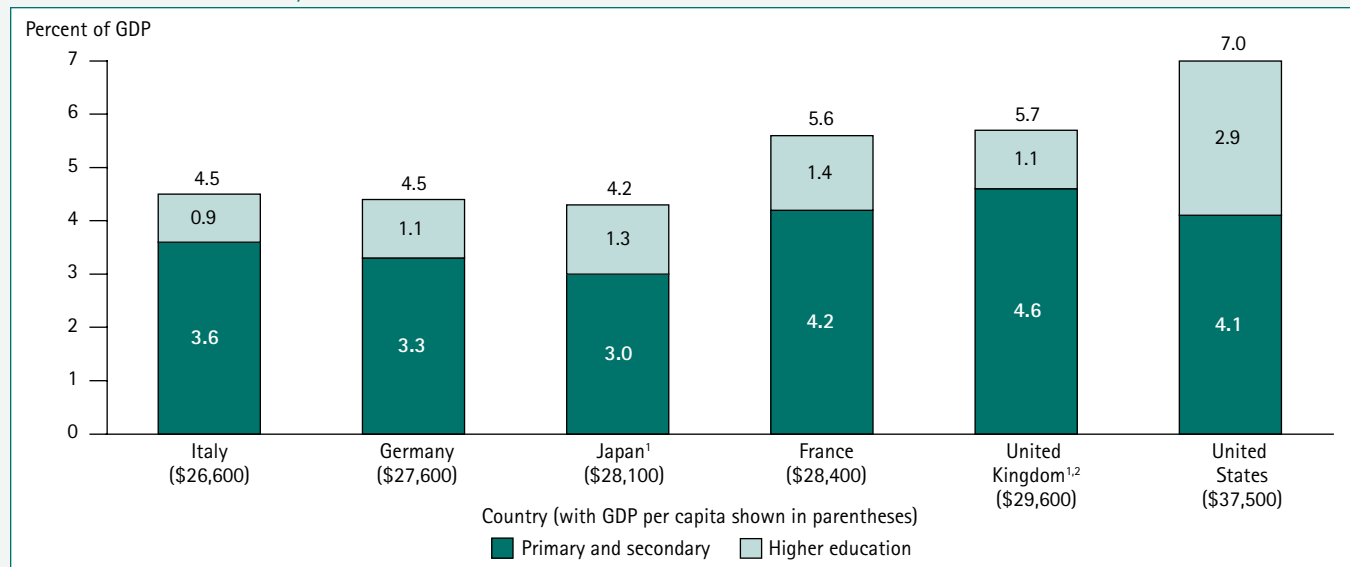
¹Postsecondary nontertiary data included in secondary and higher education for Japan, and in secondary education for the United Kingdom.

²The United Kingdom includes England, Northern Ireland, Scotland, and Wales.

NOTE: Countries are arranged according to increasing levels of gross domestic product (GDP) per capita, as shown in parentheses. Education levels are defined according to the International Standard Classification of Education (ISCED). Primary education refers to ISCED level 1. Secondary education refers to ISCED levels 2 and 3 (lower secondary and upper secondary, respectively). Higher education refers to ISCED levels 5A (academic higher education below the doctoral level), 5B (vocational higher education), and 6 (doctoral level of academic higher education), except where otherwise noted. For more information on the ISCED levels, see appendix A in this report. Shown is total expenditure that corresponds to the nonrepayable current and capital expenditure of all levels of the government and private sources directly related to education; interest on debt is not included. Data are converted to U.S. dollars using 2002–03 national purchasing power parities (PPPs) exchange rate data. Includes all institutions, public and private, with the exception of Italy, which includes public institutions only.

SOURCE: Organization for Economic Cooperation and Development (OECD). (2006). *Education at a Glance: OECD Indicators 2006*, table B1.1a and web table X2.1. Paris: Author. Retrieved November 1, 2006, from <http://www.oecd.org/dataoecd/45/55/37370984.xls>; and OECD. (2006). Education Database, previously unpublished tabulation (October 2006).

Figure 16b. Annual education expenditure as a percentage of gross domestic product (GDP), by education level and country: 2003



¹Postsecondary nontertiary data included in secondary and higher education for Japan, and in secondary education for the United Kingdom.

²The United Kingdom includes England, Northern Ireland, Scotland, and Wales.

NOTE: Countries are arranged according to increasing levels of GDP per capita, as shown in parentheses. Education levels are defined according to the International Standard Classification of Education (ISCED). Primary education refers to ISCED level 1. Secondary education refers to ISCED levels 2 and 3 (lower secondary and upper secondary, respectively). Higher education refers to ISCED levels 5A (academic higher education below the doctoral level), 5B (vocational higher education), and 6 (doctoral level of academic higher education), except where otherwise noted. For more information on the ISCED levels, see appendix A in this report. Shown is total expenditure that corresponds to the nonrepayable current and capital expenditure of all levels of the government and private sources directly related to education; interest on debt is not included. Data are converted to U.S. dollars using 2002–03 national purchasing power parities (PPPs) exchange rate data. Includes all institutions, public and private, with the exception of Italy, which includes public institutions only.

SOURCE: Organization for Economic Cooperation and Development (OECD). (2006). *Education at a Glance: OECD Indicators 2006*, table B2.1c and web table X2.1. Paris: Author. Retrieved November 1, 2006, from <http://www.oecd.org/dataoecd/45/55/37370984.xls>.

A young woman with dark hair, wearing a black graduation cap and gown, is smiling broadly. She is holding a rolled-up white diploma tied with a black ribbon in her right hand, raised above her head. The background is a soft, out-of-focus light color.

INDICATORS PART V

*Education Returns:
Educational Attainment and Income*

EDUCATIONAL ATTAINMENT IN THE ADULT POPULATION

Key Findings: Canada, France, Germany, Italy, Japan, Russian Federation, United Kingdom, United States

The Russian Federation had the largest percentage of adults ages 25 to 64 who had completed higher education; Italy had the smallest percentage. Among 25- to 34-year-olds, 36 percent of U.S. males and 42 percent of U.S. females had completed higher education.

In a majority of the G-8 countries, the largest percentage of adults ages 25 to 64 in 2004 had completed upper secondary education or postsecondary vocational training as their highest level of education (figure 17a). The exceptions were Italy, where about half of the 25- to 64-year-old population had completed lower secondary education or below, and the Russian Federation and Canada, where 55 and 45 percent of the adult population, respectively, had completed higher education. In all of the G-8 countries except the Russian Federation, less than half of the adult population had completed higher education. The Russian Federation had the largest percentage of adults ages 25 to 64 who had completed higher education, followed by Canada, and Italy had the smallest percentage (11 percent); in the United States, 39 percent of adults in 2004 had completed higher education.

Focusing on the younger adult population (ages 25 to 34) shows that in several of the G-8 countries, higher percentages of this age group had completed higher education than had the broader adult population of 25- to 64-year-olds. For example, in Canada and Japan, at least half of 25- to 34-year-olds had completed higher education (figure 17b). In France, 38 percent of 25- to 34-year-olds had completed higher education, compared with 24 percent of 25- to 64-year-olds (figures 17a and 17b). In the United States, the corresponding percentages were the same for both age groups in 2004 (39 percent).

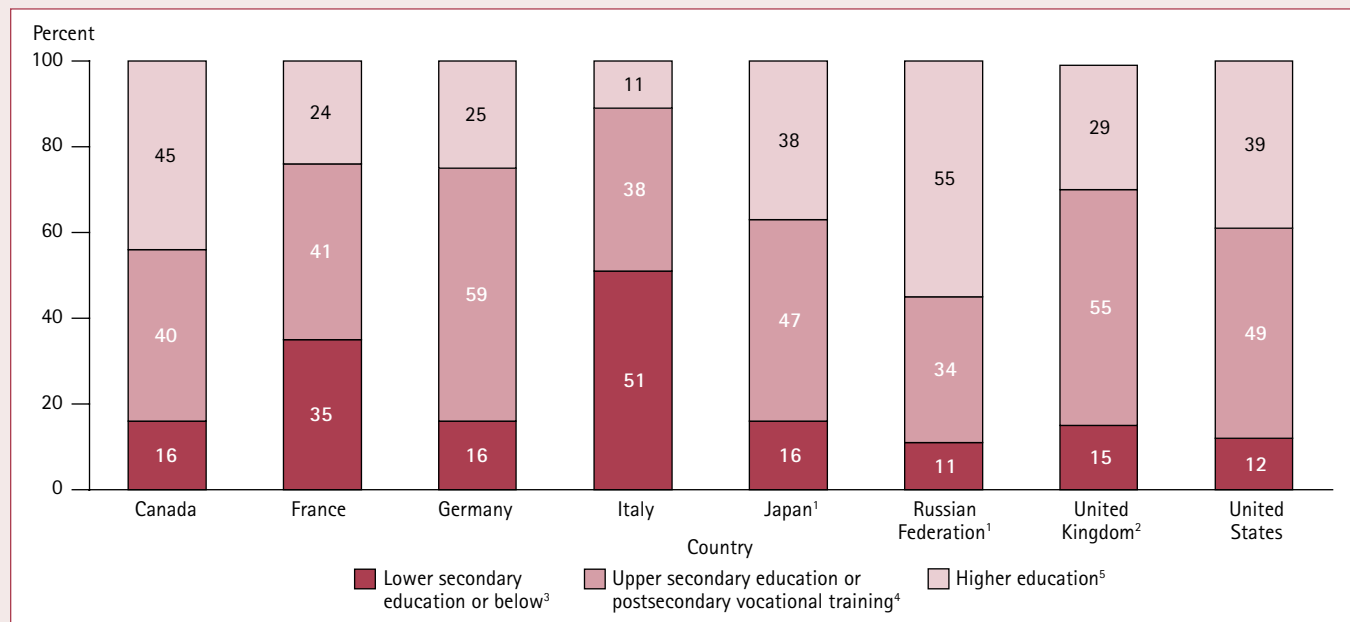
In the United States, more bachelor's degrees have been awarded to women than to men since about the mid-1980s (U.S. Department of Education 2006). Among 25- to 34-year-olds in the United States in 2004, 36 percent of males and 42 percent of females had completed higher education (figure 17b). This difference by sex favoring females was also found in Japan (5 percentage points), Italy (5 percentage points), France (7 percentage points), the Russian Federation (12 percentage points), and Canada (13 percentage points).

Definitions and Methodology

As shown in the figures, education levels are defined according to the International Standard Classification of Education (ISCED). For more information on the ISCED levels, see appendix A.

Male-female percentage-point differences in higher education completion presented in the text are computed from unrounded numbers; therefore, they may differ from computations made using the rounded whole numbers that appear in figure 17b.

Figure 17a. Percentage distribution of the population aged 25 to 64, by highest level of education completed and country: 2004



¹Reference year is 2003 rather than 2004.

²The United Kingdom includes England, Northern Ireland, Scotland, and Wales.

³Includes ISCED levels 0 (preprimary education), 1 (primary education), and 2 (lower secondary education).

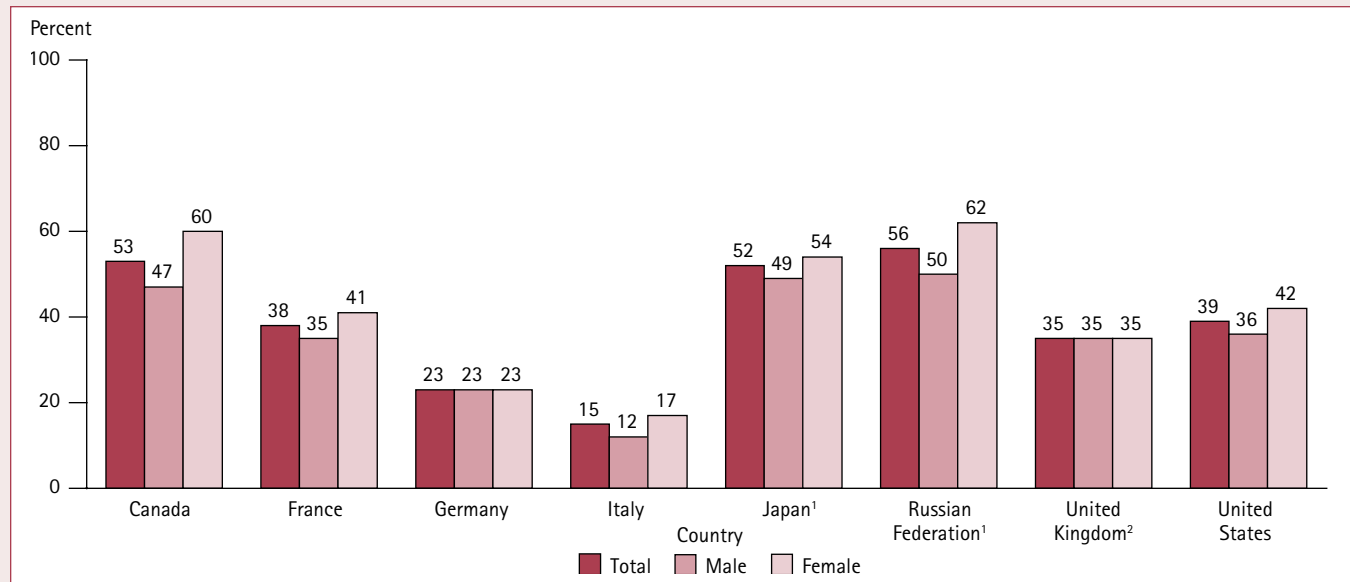
⁴Includes ISCED levels 3 (upper secondary education) and 4 (postsecondary nontertiary programs).

⁵Includes ISCED levels 5A (academic higher education below the doctoral level), 5B (vocational higher education), and 6 (doctoral level of academic higher education).

NOTE: Education levels are defined according to the International Standard Classification of Education (ISCED). For more information on the ISCED levels, see appendix A in this report. Detail may not sum to totals because of rounding.

SOURCE: Organization for Economic Cooperation and Development (OECD). (2006). *Education at a Glance: OECD Indicators 2006*, table A1.1a. Paris: Author.

Figure 17b. Percentage of the population aged 25 to 34 who had completed higher education, by sex and country: 2004



¹Reference year is 2003 rather than 2004.

²The United Kingdom includes England, Northern Ireland, Scotland, and Wales.

NOTE: Education levels are defined according to the International Standard Classification of Education (ISCED). Higher education refers to ISCED levels 5A (academic higher education below the doctoral level), 5B (vocational higher education), and 6 (doctoral level of academic higher education). For more information on the ISCED levels, see appendix A in this report.

SOURCE: Organization for Economic Cooperation and Development (OECD). (2006). *Education at a Glance: OECD Indicators 2006*, table A1.3a and web tables A1.3b and A1.3c. Paris: Author.

FIRST UNIVERSITY DEGREES BY FIELD OF STUDY

Key Findings: Canada, France, Germany, Italy, Japan, United Kingdom, United States

In science, mathematics, and engineering-related fields, the United States awarded the lowest percentage of first university degrees of all the G-8 countries.

In 2004, in all of the G-8 countries reporting data except Germany, a greater percentage of first university degrees were awarded in the combined field of social sciences, business, and law than in any other field (figure 18), with the highest percentage awarded in the United States (42 percent). In the United States, the percentage of first university degrees awarded in social sciences, business, and law was close to that awarded in the other major fields taken in total—arts and humanities; science, mathematics, and engineering; and education (44 percent).

In contrast, in science, mathematics, and engineering-related fields, the United States awarded the lowest percentage of first university degrees of all the G-8 countries. Whereas 17 percent of first university degrees in the United States were awarded in science, mathematics, and engineering-related fields, the percentages in the other G-8 countries ranged from 20 percent in Canada to 30 percent in Germany.

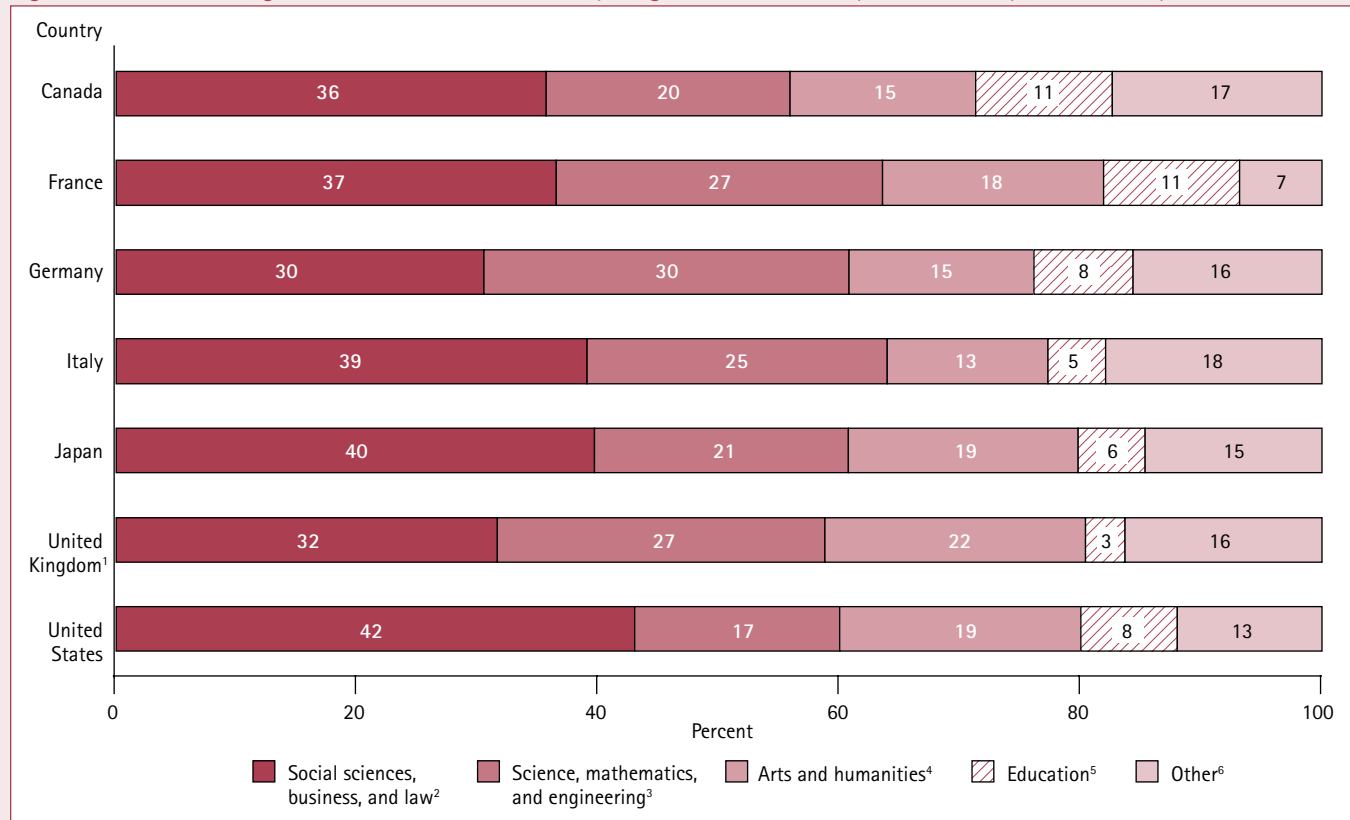
In arts and humanities and in education, the percentage of first university degrees awarded in the United States was within the range of degrees awarded in the other G-8 countries. In arts and humanities, the percentage of degrees awarded in the United States was 19 percent; in the other G-8 countries, the percentages ranged from 13 percent in Italy to 22 percent in the United Kingdom. In education, the percentage of degrees awarded in the United States was 8 percent; in the other G-8 countries, the percentages ranged from 3 percent in the United Kingdom to 11 percent in France and Canada.

Definitions and Methodology

Programs that prepare students for advanced research and highly qualified professions are classified as first university degree programs. First university degree programs vary in duration in different countries in different programs of study. In the United States, the first university degree corresponds to a bachelor's degree; it excludes associate's degrees.

The percentage of first university degrees awarded in each of the fields shown is the share of these degrees awarded in each field relative to all first university degrees awarded in all fields for a given year.

Figure 18. Percentage distribution of first university degrees awarded, by field of study and country: 2004



¹The United Kingdom includes England, Northern Ireland, Scotland, and Wales.

²Includes social and behavioral sciences (ISCED 31), journalism and information (ISCED 32), business and administration (ISCED 34), and law (ISCED 38).

³Includes life sciences (ISCED 42), physical sciences (ISCED 44), mathematics and statistics (ISCED 46), computing (ISCED 48), engineering and engineering trades (ISCED 52), manufacturing and processing (ISCED 54), and architecture and building (ISCED 58).

⁴Includes arts (ISCED 21) and humanities (ISCED 22).

⁵Includes teacher training (ISCED 141) and education science (ISCED 142).

⁶Includes agriculture, forestry, and fishery (ISCED 62); veterinary (ISCED 64); health (ISCED 72); social services (ISCED 76); personal services (ISCED 81); transport services (ISCED 84); environmental protection (ISCED 85); security services (ISCED 86); and fields of study not known or unspecified.

NOTE: The fields of education shown follow the 1997 revision of the International Standard Classification of Education Major Field of Study (ISCED MFS) (UNESCO 1997). Programs that prepare students for advanced research and highly qualified professions are classified as first university degree programs, which correspond to ISCED level 5A. For more information on the ISCED levels, see appendix A in this report. Detail may not sum to totals because of rounding.

SOURCE: Organization for Economic Cooperation and Development. (2006). Education Database. Retrieved October 26, 2006, from <http://stats.oecd.org/wbos/default.aspx?DatasetCode=RGRADSTY> and U.S. Department of Education, National Center for Education Statistics, previously unpublished tabulations (February 2007).

EMPLOYMENT RATES

Key Findings: Canada, France, Germany, Italy, Japan, United Kingdom, United States

In all of the G-8 countries, males who had completed lower secondary education or below, upper secondary education/postsecondary vocational training, or academic higher education had higher employment rates than did females with a comparable amount of education.

In the United States and all other G-8 countries reporting data, higher employment rates were associated with higher levels of educational attainment. For example, among U.S. adults ages 25 to 64 in 2004, 83 percent of those who had completed academic higher education were employed, compared with 73 percent of those whose highest educational attainment was upper secondary education or postsecondary vocational training and 57 percent of those whose highest educational attainment was lower secondary education or below (figure 19a).

In 2004, the gap in employment rates between 25- to 64-year-olds whose highest educational attainment was upper secondary education or postsecondary vocational training and those who had completed less education was 16 percentage points or greater in all G-8 countries except for Japan; in Japan, the gap was 7 percentage points. In the United States, the gap was 16 percentage points. The largest gap was in the United Kingdom, at 26 percentage points.

The gap in employment rates in the United States between adults who had completed academic higher education and their counterparts whose highest educational attainment was upper secondary education or postsecondary vocational training was 10 percentage points. In the other G-8 countries, the corresponding gap ranged from 5 percentage points in France to 14 percentage points in Germany.

Figure 19b shows employment rates separately for males and females. In all of the G-8 countries, males who had completed lower secondary education or below, upper secondary education/postsecondary vocational training, or academic higher education had higher employment rates than did females with a comparable amount of education. For males whose highest educational attainment was lower secondary education or below, employment

rates ranged from 60 percent (Germany and the United Kingdom) to 79 percent (Japan). For females, the corresponding range was 33 percent (Italy) to 53 percent (Japan). In the United States, 68 percent of males and 44 percent of females whose highest educational attainment was lower secondary education or below were employed in 2004.

For males whose highest educational attainment was upper secondary education or postsecondary vocational training, employment rates ranged from 75 percent (Germany) to 89 percent (Japan). For females, the corresponding range was 60 percent (Japan) to 74 percent (United Kingdom). In the United States, 79 percent of males and 67 percent of females whose highest educational attainment was upper secondary education or postsecondary vocational training were employed in 2004.

In all of the G-8 countries, at least 84 percent of males who had completed academic higher education were employed in 2004. For females who had completed academic higher education, employment rates ranged from 77 percent (France and Italy) to 86 percent (United Kingdom), except in Japan; in Japan, the employment rate was 67 percent.

In most of the G-8 countries, the gap in employment rates between males and females was largest among adults whose highest educational attainment was lower secondary education or below and smallest among adults who had completed academic higher education. In all of the G-8 countries except Japan, the male-female gap for lower secondary education or below was two to three times the size of the gap for academic higher education. In the United States, the male-female gap was 25, 11, and 11 percentage points among adults who had completed lower secondary education or below, upper secondary education/postsecondary vocational training, and academic higher education, respectively. In Japan, the corresponding gaps in employment rates between males and females were 26, 29, and 26 percentage points. Compared to its G-8 peers, Japan had the largest gaps at the levels of upper secondary education/postsecondary vocational training and academic higher education. Italy had the largest gap at the level of lower secondary education or below (38 percentage points).

Definitions and Methodology

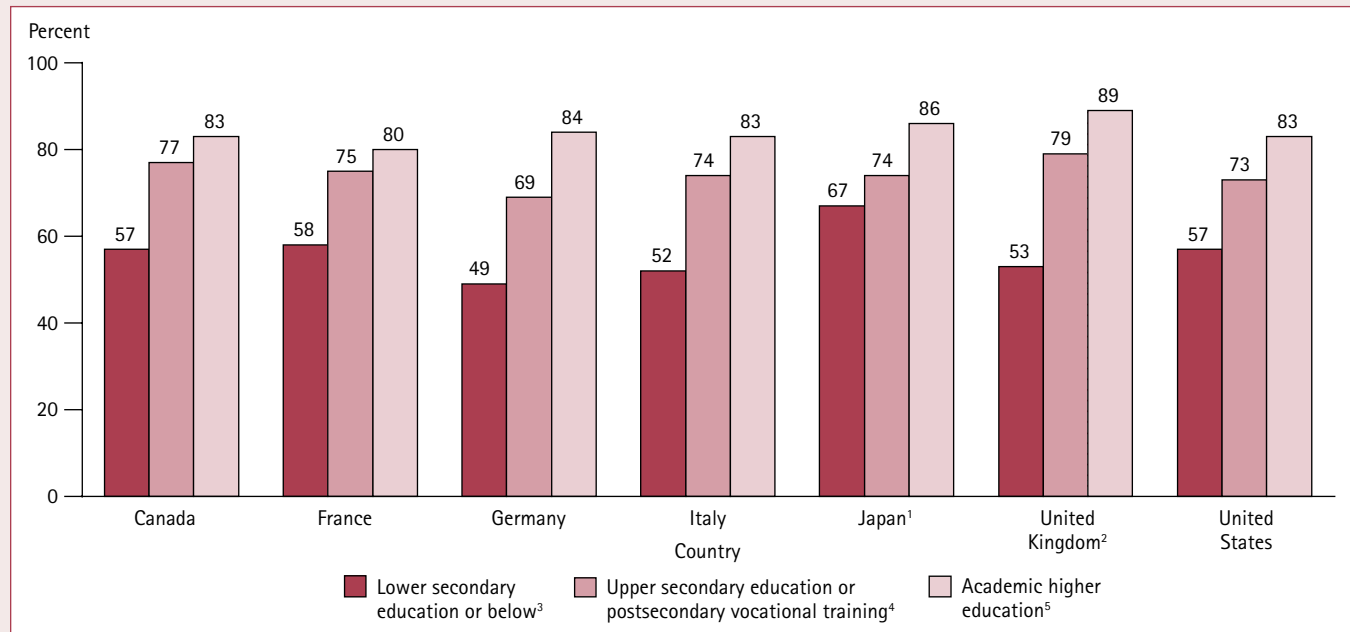
The employment rate of adults at a particular level of educational attainment is calculated as the number of individuals aged 25 to 64 with the particular level of educational attainment who are in employment divided by the number of individuals aged 25 to 64 with the same level of educational attainment.

As shown in the figures, education levels are defined according to the International Standard Classification of Education (ISCED). For more information on the ISCED levels, see appendix A. Individuals whose highest level of education is academic higher education have completed at least a first university degree program, which prepares

students for advanced research and highly qualified professions. First university degree programs vary in duration in different countries in different programs of study. In the United States, the first university degree corresponds to a bachelor's degree; it excludes associate's degrees.

Percentage-point differences presented in the text are computed from unrounded numbers; therefore, they may differ from computations made using the rounded whole numbers that appear in the figures.

Figure 19a. Employment rates of adults aged 25 to 64, by highest level of education and country: 2004



¹Reference year is 2003 rather than 2004.

²The United Kingdom includes England, Northern Ireland, Scotland, and Wales.

³Includes ISCED levels 0 (preprimary education), 1 (primary education), and 2 (lower secondary education).

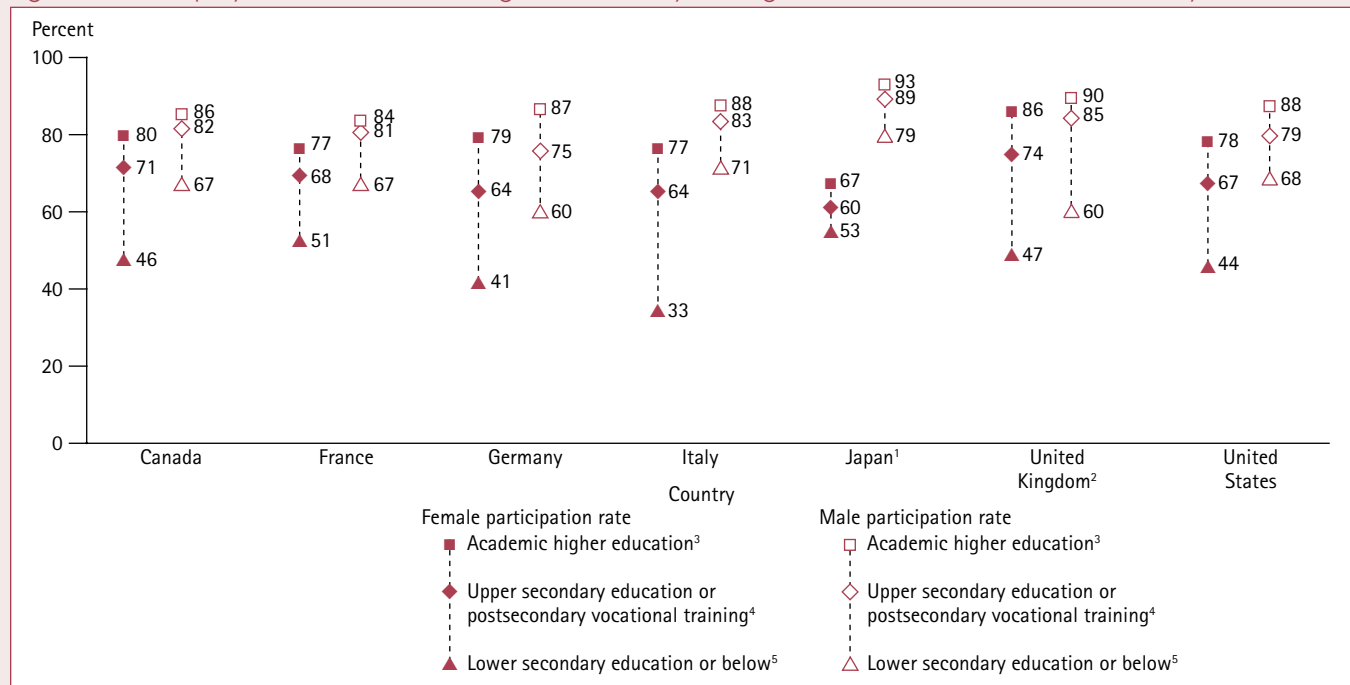
⁴Includes ISCED levels 3 (upper secondary education) and 4 (postsecondary nontertiary programs).

⁵Includes ISCED levels 5A (academic higher education below the doctoral level) and 6 (doctoral level of academic higher education).

NOTE: Education levels are defined according to the International Standard Classification of Education (ISCED). For more information on the ISCED levels, see appendix A in this report.

SOURCE: Organization for Economic Cooperation and Development (OECD). (2006). *Education at a Glance: OECD Indicators 2006*, table A8.3a and web table A8.1b. Paris: Author. Retrieved April 26, 2007, from <http://www.oecd.org/dataoecd/47/51/37363421.xls>.

Figure 19b. Employment rates of adults aged 25 to 64, by sex, highest level of education, and country: 2004



¹Reference year is 2003 rather than 2004.

²The United Kingdom includes England, Northern Ireland, Scotland, and Wales.

³Includes ISCED levels 5A (academic higher education below the doctoral level) and 6 (doctoral level of academic higher education).

⁴Includes ISCED levels 3 (upper secondary education) and 4 (postsecondary nontertiary programs).

⁵Includes ISCED levels 0 (preprimary education), 1 (primary education), and 2 (lower secondary education).

NOTE: Education levels are defined according to the International Standard Classification of Education (ISCED). For more information on the ISCED levels, see appendix A in this report.

SOURCE: Organization for Economic Cooperation and Development (OECD). (2006). *Education at a Glance: OECD Indicators 2006*, table A8.1a and web tables A8.3b and A8.3c. Paris: Author. Retrieved April 26, 2007, from <http://www.oecd.org/dataoecd/47/51/37363421.xls>.

DISTRIBUTION OF POPULATION BY EDUCATION AND INCOME

Key Findings: Canada, France, Germany, Italy, United Kingdom, United States

Forty-four percent of U.S. adults whose highest educational attainment was at the lower secondary level or below earned at or below half of the median income of U.S. adults. The U.S. percentage was higher than the corresponding percentages in all of the other G-8 countries.

Observing the distribution of populations at various education levels by earnings is one way to examine the relationship between education and earnings across countries. In this indicator, the extent to which higher levels of educational attainment are linked to higher incomes is examined across the populations of the G-8 countries.

In all of the G-8 countries reporting data, adults with a relatively low level of education (i.e., those whose highest educational attainment is at the lower secondary level or below) tended to have lower income levels. For example, 83 percent of U.S. adults ages 25 to 64 whose highest educational attainment was at the lower secondary level or below earned at or below the median income of U.S. adults in 2004 (table 5). The U.S. percentage was higher than the corresponding percentages in all of the other G-8 countries except the United Kingdom (also at 83 percent). The four other G-8 countries had percentages that ranged from 62 percent in Italy to 69 percent in France. Many people with low levels of education also earned at or below half of the median income; 44 percent of U.S. adults whose highest educational attainment was at the lower secondary level or below earned at or below half of the median income of U.S. adults in 2004. The U.S. percentage was higher than the corresponding percentages in all of the other G-8 countries, with those for Italy and France being the lowest (19 and 17 percent, respectively). In contrast, the percentage of adults at or below the level of lower secondary education who had more than two times the median income of all 25- to 64-year-olds in their respective

countries ranged from 1 percent in the United Kingdom and Germany to 9 percent in Italy, with the United States at 2 percent.

Across the G-8 countries, adults who had completed academic higher education tended to have higher income levels. For example, 69 percent of U.S. adults ages 25 to 64 who had completed academic higher education earned more than the median income of U.S. adults in 2004 (table 5 and figure 20). In the other G-8 countries, the corresponding percentages ranged from 67 percent in Canada to 79 percent in France. Many people with high levels of education also earned more than two times the median income; 30 percent of U.S. adults ages 25 to 64 who had completed academic higher education earned more than two times the median income of U.S. adults in 2004 (table 5). The corresponding percentages in the other G-8 countries ranged from 23 percent in Germany to 34 percent in Italy. In contrast, less than 10 percent of adults who had completed academic higher education earned at or below half of the median income in three G-8 countries (France, the United Kingdom, and Italy). The corresponding percentages in the other G-8 countries were 12 percent in the United States, 13 percent in Germany, and 18 percent in Canada.

Compared to adults whose highest level of education was lower secondary or below or academic higher education, adults ages 25 to 64 whose highest educational attainment was upper secondary education or postsecondary vocational training were more evenly divided with respect to earning at or below the median income and earning more than the median income. Across the G-8 countries, no more than 60 percent of adults earned at or below the median income of adults in their respective countries, and no less than 40 percent earned more than the median income of adults in their respective countries.

Definitions and Methodology

Income refers to pretax income.

As shown in the table and figure, education levels are defined according to the International Standard Classification of Education (ISCED). For more information on the ISCED levels, see appendix A. Individuals whose highest level of education is academic higher education have completed at least a first university degree program,

which prepares students for advanced research and highly qualified professions. First university degree programs vary in duration in different countries in different programs of study. In the United States, the first university degree corresponds to a bachelor's degree; it excludes associate's degrees.

Table 5. Percentage of the population aged 25 to 64, by highest level of education, income, and country: 2004

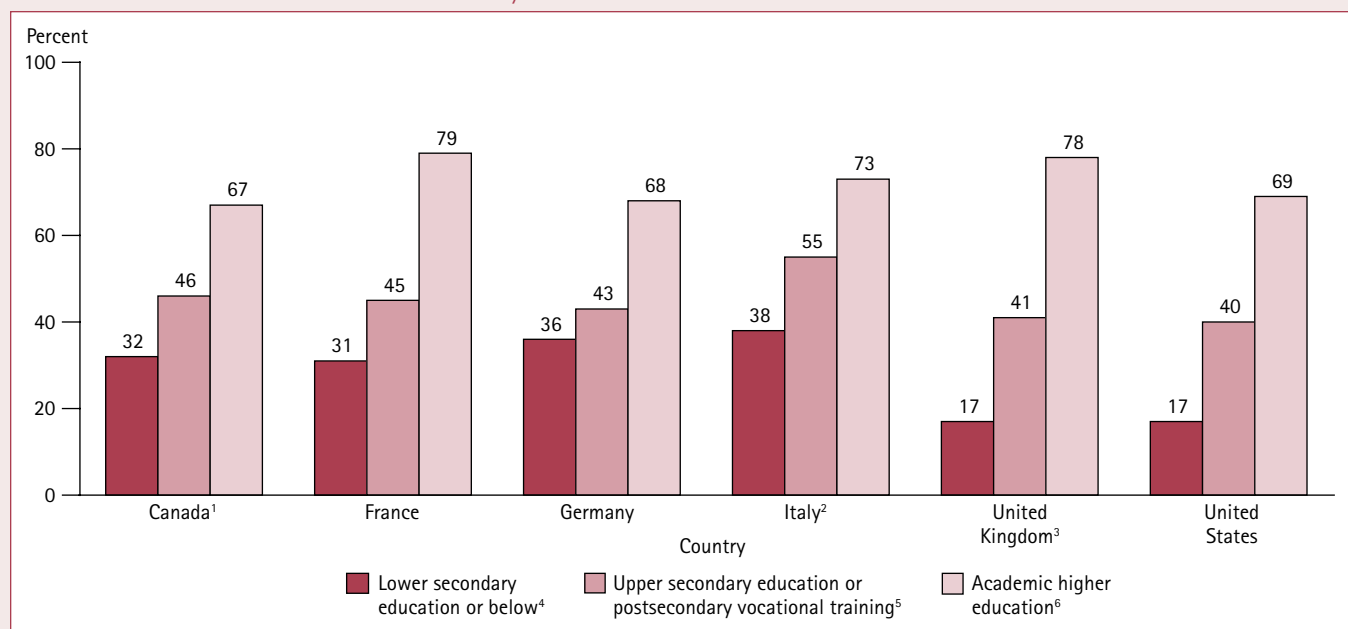
Education level and income	Canada ¹	France	Germany	Italy ²	United Kingdom ³	United States
Lower secondary level or below⁴						
At or below half of the median income	37.9	17.1	25.2	19.5	37.9	44.3
At or below the median income	67.8	69.0	63.8	61.8	82.6	83.4
More than the median income	32.2	31.0	36.2	38.2	17.4	16.6
More than two times the median income	6.4	2.3	1.4	8.5	1.4	1.8
Upper secondary education or postsecondary vocational training⁵						
At or below half of the median income	27.7	8.2	23.0	10.1	21.4	24.1
At or below the median income	54.5	55.1	56.8	45.1	58.8	60.0
More than the median income	45.5	44.9	43.2	54.9	41.2	40.1
More than two times the median income	11.1	4.4	5.3	14.9	6.3	8.3
Academic higher education⁶						
At or below half of the median income	17.8	4.1	13.4	6.8	6.1	12.0
At or below the median income	33.1	20.6	31.7	26.7	22.1	30.8
More than the median income	66.9	79.4	68.3	73.3	77.9	69.2
More than two times the median income	32.8	26.4	23.2	34.1	29.1	30.4

¹Reference year is 2003 rather than 2004.²Reference year is 2002 rather than 2004.³The United Kingdom includes England, Northern Ireland, Scotland, and Wales.⁴Includes ISCED levels 0 (preprimary education), 1 (primary education), and 2 (lower secondary education).⁵Includes ISCED levels 3 (upper secondary education) and 4 (postsecondary nontertiary programs).⁶Includes ISCED levels 5A (academic higher education below the doctoral level) and 6 (doctoral level of academic higher education).

NOTE: Education levels are defined according to the International Standard Classification of Education (ISCED). For more information on the ISCED levels, see appendix A in this report.

SOURCE: Organization for Economic Cooperation and Development (OECD). (2006). *Education at a Glance: OECD Indicators 2006*, table A9.4a. Paris: Author.

Figure 20. Percentage of the population aged 25 to 64 who earned more than the median income, by highest level of education and country: 2004

¹Reference year is 2003 rather than 2004.²Reference year is 2002 rather than 2004.³The United Kingdom includes England, Northern Ireland, Scotland, and Wales.⁴Includes ISCED levels 0 (preprimary education), 1 (primary education), and 2 (lower secondary education).⁵Includes ISCED levels 3 (upper secondary education) and 4 (postsecondary nontertiary programs).⁶Includes ISCED levels 5A (academic higher education below the doctoral level) and 6 (doctoral level of academic higher education).

NOTE: Education levels are defined according to the International Standard Classification of Education (ISCED). For more information on the ISCED levels, see appendix A in this report.

SOURCE: Organization for Economic Cooperation and Development (OECD). (2006). *Education at a Glance: OECD Indicators 2006*, table A9.4a. Paris: Author.

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APPENDIX A

The Education Systems of the G-8 Countries

READER'S GUIDE: EDUCATION SYSTEM CHARTS

Differences in the structure of countries' education systems often make international comparisons difficult. To improve the comparability of education indicators, the United Nations Educational, Scientific and Cultural Organization (UNESCO) created an internationally comparable method for describing levels of education across countries called the International Standard Classification of Education (ISCED). Using the ISCED classifications as a starting point, NCES worked with education professionals in the G-8 countries to create an overview of each country's education system.

There are differences within the education systems of some G-8 countries due to responsibilities and oversight for education taking place at the regional or local level. However, the charts and accompanying text in this appendix are intended to give the reader a general overview of the education system of each G-8 country, from the preprimary to the doctoral level. Thus, some differences within the education systems of G-8 countries may not be discussed here.

As indicated in the source note for each country chart, the information summarizing each country's education system comes largely from the previous Comparative Indicators report (in 2004). However, there are some differences in what appears in the current report compared to the 2004 report. As indicated in some of the source notes, some additional information comes from updated online resources. Also, some modifications were made based on comments received from several international reviewers: Yves Beaudin of the Canadian Information Centre for International Credentials (Toronto, Canada), Galina Kovalyova of the Russian Academy of Education (Moscow, Russian Federation), Thierry Rocher of the Ministry of National Education (Paris, France), Hanako Senuma of the National Institute for Educational Policy Research (Tokyo, Japan), and Linda Sturman and Liz Twist of the National Foundation for Educational Research (Slough, United Kingdom).

The reader is encouraged to seek out additional resources to gain a fuller and deeper understanding of each country's education system. A list of websites with additional information is provided at the end of this Reader's Guide, and additional sources are cited after each country's education system is presented.

How to Read the Charts

Each of the charts on the following pages is a broad representation of the education system of a G-8 country. The charts are not intended to show all of the possible pathways that a student can take or the many configurations of grades that may be found within the same school. Rather, each chart is intended to provide a general description that is useful for comparison across the G-8 countries.

The colors on each chart correspond to ISCED levels (see next section). The ISCED term for each level of education is written within each block. The terms in italics in each block are a country's designation for that particular level (e.g., *high school* for upper secondary

school). The left side of each chart is labeled with the typical ages corresponding to each level of education. The age labels represent the typical age at which a student begins the corresponding year of schooling; often, students are 1 year older at the end of the school year. Ages in bold text are the ages at which enrollment is universal, defined as an enrollment rate of over 90 percent. The rectangular box encasing some ages represents the range of ages at which enrollment is compulsory, or required by law. The expected duration of a first university degree program, a bachelor's degree program in the United States, is listed in the note below each chart. On the right side of each chart are the years of schooling ("grade," in the United States) corresponding to each level of education. The first year of schooling corresponds to the first year of compulsory education. The ages and years listed assume normal progress through the education system.

ISCED Levels

The ISCED is a classification framework that allows for the alignment of the content of education systems using multiple classification criteria. The ISCED levels address the intent (e.g., to study basic subjects or prepare students for university) of each year of a particular education system, but do not indicate the depth or rigor of study in that year. Thus, the ISCED is useful when comparing the age range of students in upper secondary schools across nations; however, it does not indicate whether the curriculum and standards are equivalent within the same year of schooling across nations. The ISCED allows researchers to compile statistics on education internationally. The ISCED levels are as follows:

- ISCED level 0 is classified as preprimary education. This is defined as the initial stage of organized instruction, designed primarily to introduce very young children to a school-type environment. ISCED level 0 programs can either be center or school based. Preschool and kindergarten programs in the United States fall into the level 0 category, although kindergarten is typically considered an elementary grade in the United States.
- ISCED level 1 consists of primary education, which usually lasts 4 to 6 years. ISCED level 1 typically begins between ages 5 and 7, and is the stage where students begin to study basic subjects, such as reading, writing, and mathematics. In the United States, elementary school (grades 1 through 6) is classified as level 1.
- At ISCED level 2, or lower secondary education, students continue to learn the basic subjects taught in level 1, but this level is typically more subject specific than level 1 and may be taught by specialized teachers. ISCED level 2 usually lasts between 2 and 6 years, and begins around the age of 11. Middle school and junior high (grades 7 through 9) in the United States are classified as level 2.
- At ISCED level 3, or upper secondary education, student coursework is generally subject specific and often taught by specialized

teachers. Students often enter upper secondary education at the age of 15 or 16 and attend anywhere from 2 to 5 years. ISCED level 3 can prepare students for university, further schooling, or the labor force. Senior high school (grades 9 through 12) is considered level 3 in the United States.

- ISCED level 4 programs consist of postsecondary nontertiary programs. Postsecondary nontertiary programs are primarily vocational and are taken after the completion of secondary school, though the content is not more advanced than the content of secondary school courses. Although not included in the charts, postsecondary nontertiary programs are described in the text. ISCED level 4 programs in the United States are often in the form of 1-year certificate programs.
- Tertiary programs¹ are divided into ISCED levels 5A, 5B, and 6. ISCED level 5A refers to academic higher education below the doctoral level. Level 5A programs are intended to provide sufficient qualifications to gain entry into advanced research programs and professions with high skill requirements. The international classification includes programs of medium length that last less than 5 years and long programs that last 5 to 7 years. In the United States, bachelor's, master's, and first professional degree programs are classified as ISCED level 5A. ISCED level 5B refers to vocational higher education. Level 5B programs provide a higher level of career and technical education and are designed to prepare students for the labor market. In the international classification, these programs last 2 to 4 years. ISCED level 6 refers to the doctoral level of academic higher education. Level 6 programs usually require the completion of a research thesis or dissertation.

Text Format

The text accompanying each chart is meant to give the reader more detail on each country's education system. The bulleted format is designed to make quick comparisons more convenient, and the text is divided into sections corresponding to the ISCED levels.

The "NOTE" heading in each section presents information that is important, but that may not be included in either the chart or the bulleted text, including within-country variations or features of the education system that are unique to a particular country.

Websites with Additional Information

Canada: <http://www.statcan.ca/english/freepub/81-582-XIE/free.htm> (see appendix 3)

France: <http://www.eurydice.org/portal/page/portal/Eurydice> (see France)

Germany: <http://www.eurydice.org/portal/page/portal/Eurydice> (see Germany)

Italy: <http://www.eurydice.org/portal/page/portal/Eurydice> (see Italy)

Japan: <http://www.mext.go.jp/english/statist/05101901.htm>

Russian Federation: <http://www.euroeducation.net/prof/russco.htm>

Scotland: <http://www.eurydice.org/portal/page/portal/Eurydice> (see United Kingdom: Scotland)

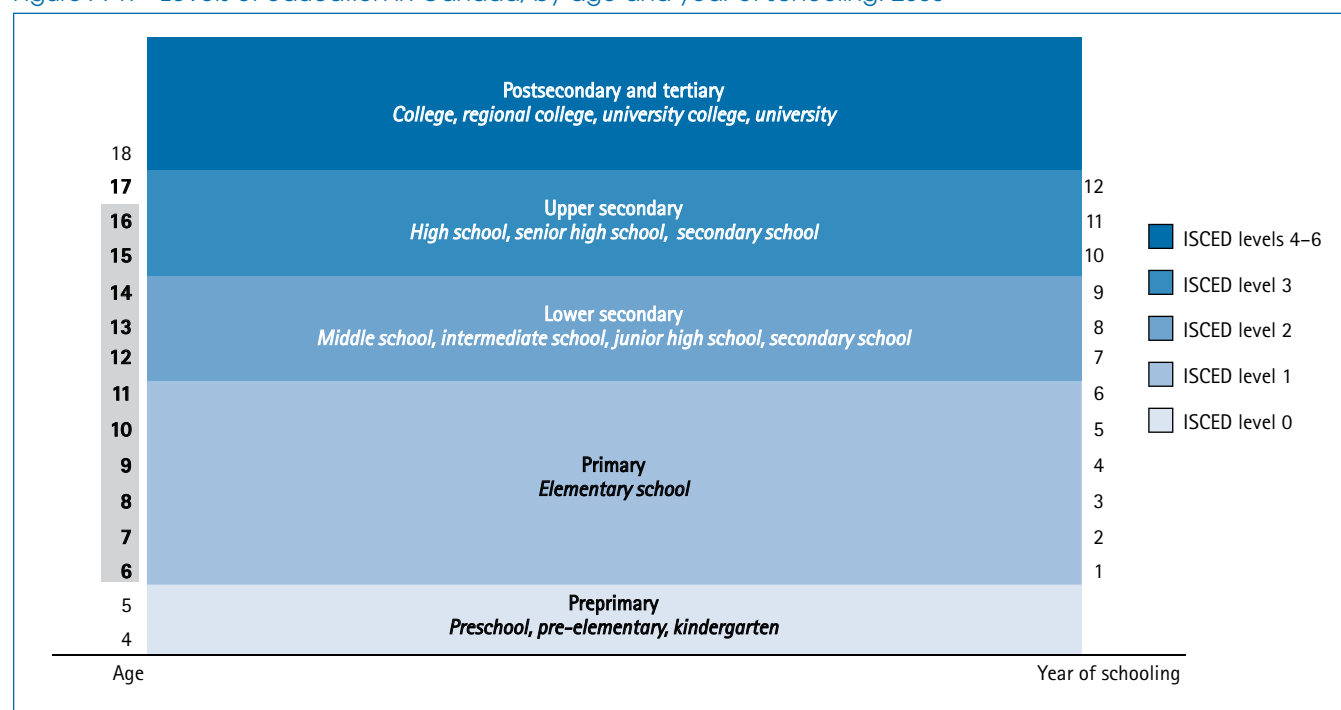
United Kingdom: <http://www.eurydice.org/portal/page/portal/Eurydice> (see United Kingdom: England, Wales, and Northern Ireland)

United States: www.ed.gov/international/edus

¹In the international classification, more advanced postsecondary education (such as attending a 4-year college or university) is referred to as tertiary education. In the current report, the term "higher education" is used because this term is more familiar to American readers.

THE EDUCATION SYSTEM IN CANADA

Figure A-1. Levels of education in Canada, by age and year of schooling: 2006



NOTE: Ages represent the typical age at the beginning of the school year. Numbers in bold print indicate ages of universal enrollment (i.e., an enrollment rate of over 90 percent). Numbers shaded represent the age at which compulsory enrollment begins through the age at which compulsory enrollment ends. In some countries, enrollment rates may fall below universal before the ending age of compulsory education. No meaning should be inferred from width of subdivisions. Duration of first university degree program is generally 4 years in Canada.
SOURCE: Sen, A., Partelow, L., and Miller, D.C. (2005). *Comparative Indicators of Education in the United States and Other G8 Countries: 2004* (NCES 2005-021). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

NOTE: There are differences within the education system of Canada due to responsibilities and oversight for education taking place at the regional or local level. However, the purpose of this document is to present a brief, general summary of education in Canada. Thus, some differences within the education system of Canada may not be discussed here. The sources cited at the end of this section provide more specific details about education in Canada.

Preprimary:

- Common name: *Preschool, pre-elementary, kindergarten*
- Ages of attendance: As early as age 4 to age 5
- Number of years: 1 to 2
- Start of universal enrollment: Does not begin in preprimary; see below
- Compulsory: Generally no, but yes in some provinces

NOTE: One-year pre-elementary programs are available to Canadian children in all provinces. In some provinces, an additional 1 or 2 years of pre-elementary programs are offered.

Primary:

- Common name: *Elementary school*
- Ages of attendance: 6 to 11
- Number of years: 6

- Start of universal enrollment: Age 6
- Universal enrollment: Yes
- Compulsory: Yes

NOTE: Elementary school can begin at age 6 or 7 in Canada, depending on the jurisdiction. Based on the ISCED, the first 6 years of formal schooling are considered primary school, although in some jurisdictions primary school can last for up to 8 years.

Lower secondary:

- Common name: *Middle school, intermediate school, junior high school, secondary school*
- Ages of attendance: 12 to 14
- Number of years: 2 to 3
- Universal enrollment: Yes
- Compulsory: Yes
- Entrance/exit criteria: No

NOTE: Based on the ISCED, the 3 years of schooling following primary school are classified as lower secondary school in Canada. Students may attend 2- or 3-year junior high schools or middle schools, or they may go directly to a secondary school that includes both lower and upper secondary school.

Upper secondary:

- Common name: *High school, senior high school, secondary school*
- Ages of attendance: 15 to 17 (graduation generally at age 18)
- Number of years: 3
- Universal enrollment: Through age 17
- Compulsory: Until age 16 in most jurisdictions; until 18 or graduation in New Brunswick
- Entrance/exit criteria: Some provinces have what could be considered an exit exam (e.g., Ontario administers a grade 10 literacy test, and Quebec requires that students take core subject exams, which are a significant part of the graduation requirements).

NOTE: Based on the ISCED, the last 3 years of schooling prior to receiving a high school diploma are classified as upper secondary school in Canada. Senior high schools may be up to 4 years in length, and many students attend secondary schools that include both lower and upper secondary school programs.

Postsecondary and tertiary:

- Common name: *College, regional college, university college, university*
- Ages of attendance: Varies
- Number of years: Varies according to degree
- Universal enrollment: No
- Entrance criteria: Graduation from a secondary school academic or university preparatory program—or, in the case of Quebec, completion of a 2-year pre-university program—is typically the minimum requirement to be eligible for admission to undergraduate degree programs. However, most institutions and/or departments set their own admissions standards, often with more rigorous requirements.

Common degree programs:

- **Pre-university programs:** 2-year programs that students in Quebec are generally required to complete before they are eligible to attend university.
- **Certificate:** 1-year programs offered at colleges, regional colleges, community colleges, institutes, and colleges of applied arts and technology (the name depends on the jurisdiction).

These programs are vocational and are oriented toward preparing students for the labor force in semiprofessional and technical fields.

- **Diploma:** 2- to 3-year programs offered at community colleges, regional colleges, etc. These programs are vocational and are oriented toward preparing students for the labor force in semiprofessional and technical fields.
- **Bachelor's degree:** 3- to 4-year academic programs at a university college or university. (University bachelor's degree programs are usually 4 years, while university college programs can be 3 or 4 years.)
- **Master's degree:** Graduate programs at a university requiring 1 to 2 years beyond the bachelor's degree. This degree is designed to prepare students for professional careers.
- **Doctorate:** Academic graduate programs at a university requiring 3 to 5 years after the bachelor's degree. Doctoral programs prepare students for careers in research.

Sources

Canadian Education Statistics Council. (2003). *Report of the Pan-Canadian Education Indicators Program, appendix 1*. Ontario, Canada: Statistics Canada. Retrieved October 31, 2006, from <http://www.cesc.ca/pceip/PCEIP2003en.pdf>.

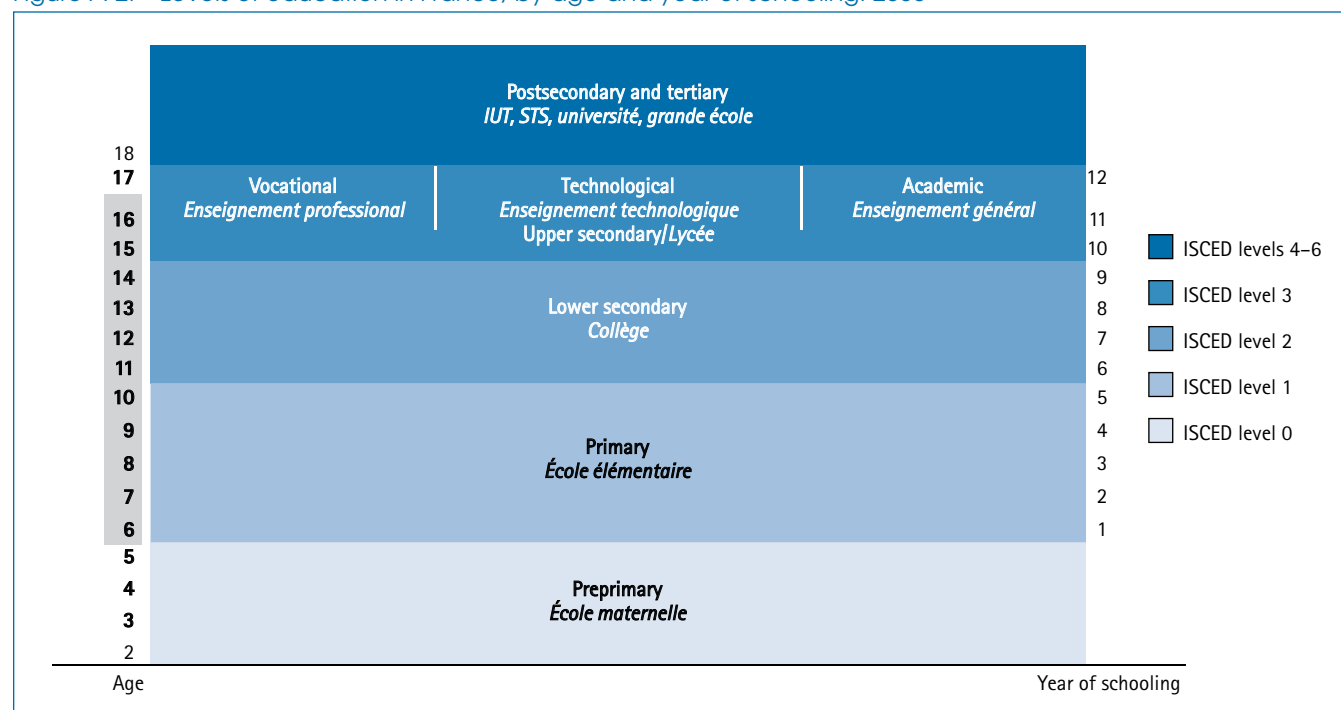
Marlow-Ferguson, R. (Ed.) (2002). *World Education Encyclopedia: A Survey of Educational Systems Worldwide, Vol. 1* (2nd ed.). Farmington Hills, MI: Gale Group.

Organization for Economic Cooperation and Development. (1996). *Education at a Glance: OECD Indicators*. Paris: Author.

Robitaille, D.F. (1997). *National Contexts for Mathematics and Science Education: An Encyclopedia of the Education Systems Participating in TIMSS*. Vancouver, Canada: Pacific Educational Press.

THE EDUCATION SYSTEM IN FRANCE

Figure A-2. Levels of education in France, by age and year of schooling: 2006



NOTE: Ages represent the typical age at the beginning of the school year. Numbers in bold print indicate ages of universal enrollment (i.e., an enrollment rate of over 90 percent). Numbers shaded represent the age at which compulsory enrollment begins through the age at which compulsory enrollment ends. In some countries, enrollment rates may fall below universal before the ending age of compulsory education. No meaning should be inferred from width of subdivisions. Duration of first university degree program is generally 4 years in France.

SOURCE: Sen, A., Partelow, L., and Miller, D.C. (2005). *Comparative Indicators of Education in the United States and Other G8 Countries: 2004* (NCES 2005-021). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

Preprimary:

- Common name: *École maternelle*
- Ages of attendance: As early as age 2 to age 5
- Number of years: 1 to 4
- Start of universal enrollment: Age 3 (see indicator 2)
- Compulsory: No

Primary:

- Common name: *École élémentaire*
- Ages of attendance: 6 to 10
- Number of years: 5
- Universal enrollment: Yes
- Compulsory: Yes

Lower secondary:

- Common name: *Collège*
- Ages of attendance: 11 to 14
- Number of years: 4
- Universal enrollment: Yes
- Compulsory: Yes

- Entrance/exit criteria: Yes; *brevet des collèges* is the exit exam for lower secondary. It is a national examination, which determines whether or not students will be able to attend *lycée*.

Upper secondary:

- Common name: *Lycée*
 - *Enseignement professionnel*—Vocational upper secondary school
 - *Enseignement technologique*—Technological upper secondary school
 - *Enseignement général*—Academic upper secondary school
- Ages: 15 to 17 (graduation generally at age 18)
- Number of years: 3
- Universal enrollment: Through age 17 (see indicator 2) (most students turn 18 during the last year of upper secondary school)
- Compulsory: Until age 16
- Entrance/exit criteria: In order to enter upper secondary education, students must pass the *brevet des collèges*. Students take a national examination, the *baccalauréat*, during the last year of secondary school, which determines entrance to university.

NOTE: All three types of upper secondary school (*enseignement professionnel, technologique, and general*) qualify a student to enter university, although certain tracks are more likely to lead to university: the academic branch (*enseignement general*) typically leads to university and other forms of higher education; the technological branch (*enseignement technologique*) may also lead to specialized technological or professional forms of higher education; and the vocational branch (*enseignement professionnel*) more often leads to the labor force and/or job training.

Postsecondary and tertiary:

- Common name: *IUT, STS, université, grande école*
- Ages of attendance: Varies
- Number of years: Varies according to degree or program
- Universal enrollment: No
- Entrance criteria: In order to enter into higher education programs in France, students are required to have passed the *baccalauréat* or an equivalent. Entrance to the university is nonselective, meaning that students who have passed the *baccalauréat* are entitled to enter. There are, however, competitive entrance exams for the *grandes écoles*.

Common programs (short fields):

- **DUT (University degree in technology):** Taken at the University Institute of Technology (IUT). Two-year program in mostly vocational subjects. Student may choose to continue on toward a *license* (see following section).
- **BTS (Higher technical diploma):** Two-year program taken in higher education departments of *lycées (STS, Institute for Higher Technical Studies)*; more specialized than degrees from IUT, but also in mostly vocational subjects.
- **DEUG (General university studies degree):** Academic degree received after completion of 2 years of university.

Common degree programs (long fields):

- **License:** *DEUG* (see above) plus 1 additional year at university.
- **Maîtrise:** Degree following the *license*. Requires 1 additional year at university.

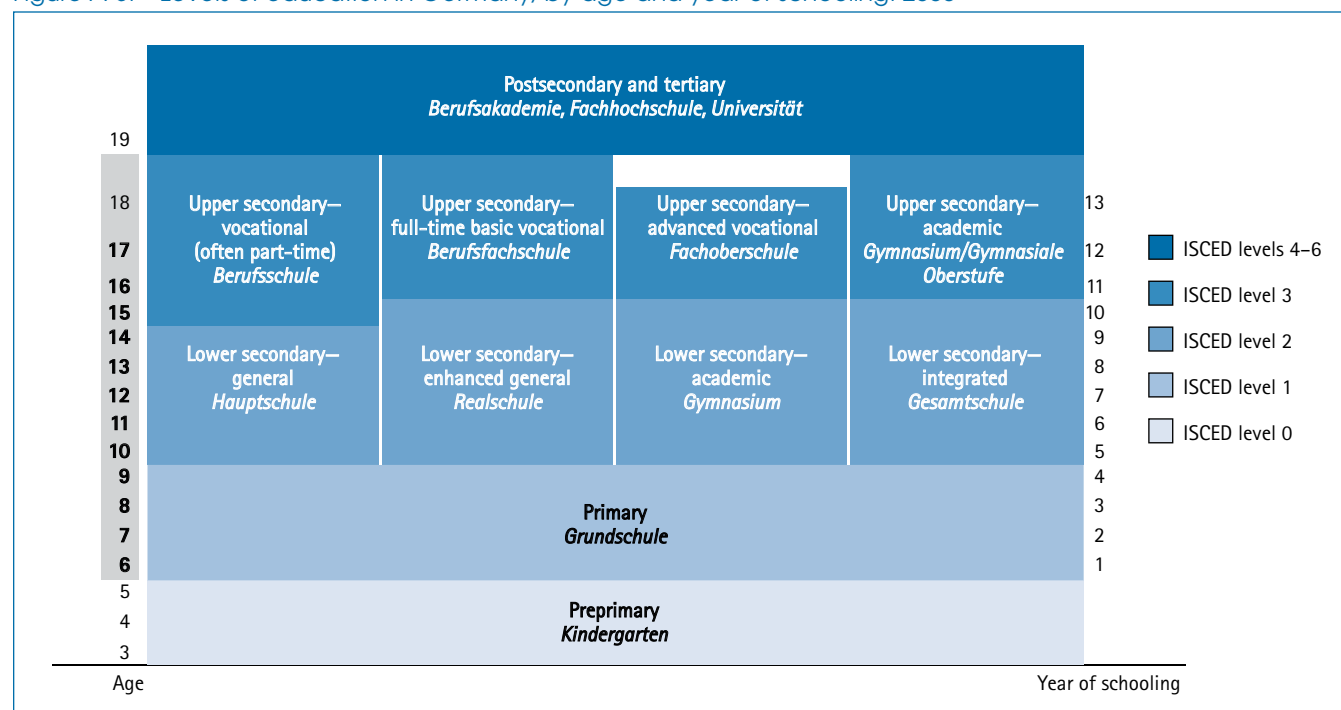
- **DESS (Diploma of specialized higher studies):** Follows the *maîtrise*; 1-year professional course involving a required internship.
- **DEA (Diploma of advanced studies):** Follows the *maîtrise*; 1-year program designed to prepare students for doctoral research. Involves the preparation of a research project.
- **Medical doctor/dental/pharmacy:** Degree programs taken at the university. Length of program varies and can lead to degrees such as the *doctorat de médecine spécialisé, doctorat de médecine generale, and doctorat pharmacie*.
- **Doctorat:** Research-based graduate degree program at a university, leading to a doctorate. Usually requires 5 years of study beyond the *maîtrise*.
- **Diplôme grande école:** Competitive degree programs (students must pass a selective entrance exam) in academic subjects, science, commerce, management, engineering, business, and architecture. These are typically 5-year programs and are taken at the *grandes écoles*.

Sources

- Eurybase. (2006). The Information Database on Education Systems in Europe: The Education System in France, 2005/2006. Brussels: Eurydice. Retrieved October 31, 2006, from <http://194.78.211.243/Eurybase/Application/frameset.asp?country=FR&language=EN>.
- Marlow-Ferguson, R. (Ed.) (2002). *World Education Encyclopedia: A Survey of Educational Systems Worldwide, Vol. 1* (2nd ed.). Farmington Hills, MI: Gale Group.
- Organization for Economic Cooperation and Development. (1996). *Education at a Glance: OECD Indicators*. Paris: Author.
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THE EDUCATION SYSTEM IN GERMANY

Figure A-3. Levels of education in Germany, by age and year of schooling: 2006



NOTE: Ages represent the typical age at the beginning of the school year. Numbers in bold print indicate ages of universal enrollment (i.e., an enrollment rate of over 90 percent). Numbers shaded represent the age at which compulsory enrollment begins through the age at which compulsory enrollment ends. In some countries, enrollment rates may fall below universal before the ending age of compulsory education. No meaning should be inferred from width of subdivisions. Duration of first university degree program is generally 4 years in Germany.
SOURCE: Sen, A., Partelow, L., and Miller, D.C. (2005). *Comparative Indicators of Education in the United States and Other G8 Countries: 2004* (NCES 2005-021). U.S. Department of Education. Washington, DC: National Center for Education Statistics; and German Education Server (Deutscher Bildungs Server). (2006). Basic Structure of the Education System in the Federal Republic of Germany. Retrieved January 30, 2007, from <http://www.kmk.org/doku/diagr.htm>.

NOTE: There are differences within the education system of Germany due to responsibilities and oversight for education taking place at the regional or local level. However, the purpose of this document is to present a brief, general summary of education in Germany. Thus, some differences within the education system of Germany may not be discussed here. The sources cited at the end of this section provide more specific details about education in Germany.

Preprimary:

- Common name: *Kindergarten*
- Ages of attendance: As early as age 3 to age 5
- Number of years: 1 to 3
- Start of universal enrollment: Does not begin in preprimary; see below
- Compulsory: No

NOTE: Students may attend preprimary programs in a few schools at age 2.

Primary:

- Common name: *Grundschule*
- Ages of attendance: 6 to 9

- Number of years: 4
- Start of universal enrollment: Age 6 (see indicator 2)
- Compulsory: Yes

NOTE: In some *Länder* (the German equivalent of states), *Grundschule* lasts 6 years.

Lower secondary:

- Common name:
 - *Hauptschule*—General secondary school
 - *Realschule*—Enhanced general education secondary school
 - *Gymnasium*—Academic secondary school
 - *Gesamtschule*—Integrated secondary school, meaning that students are not split into separate general education and academic tracks
- Ages of attendance: 10 to 15
- Number of years: 5 to 6
- Universal enrollment: Yes
- Compulsory: Yes
- Entrance/exit criteria: In some *Länder*, admissions tests determine if a student can take the education tracks of *Realschule* or *Gymnasium*.

NOTE: There are different types of secondary schools, some combining *Hauptschule* and *Realschule*. The secondary school a student in Germany attends is determined by a combination of factors, depending on the *Länder*: admissions tests, previous grade point average, teacher recommendations, and parents' wishes. The degree of flexibility that a parent has in choosing which educational track their child enters also varies between regions.

However, the type of school a student attends is sometimes less important than the chosen track: at the end of lower secondary, all students who meet the requirements receive a leaving certificate. At the *Hauptschule* it is generally the *Hauptschulabschluss*, but students who excel may receive a *Realschulabschluss* (called the *Mittlere Schulabschluss* in some *Länder*). At the *Realschule*, students typically receive the *Realschulabschluss*; at the *Gesamtschule*, both types of diplomas are offered. All students attending *Gymnasium* who advance to the upper secondary level automatically receive the *Realschulabschluss*.

Some *Länder* also have an orientation phase during the first 2 years of lower secondary school, which gives parents and teachers 2 more years to decide a child's educational path. In *Länder* with a 6-year primary school, lower secondary school is 2 years shorter.

Upper secondary:

- Common name:
 - *Berufsschule*—3- to 4- year vocational school, which often includes an apprenticeship; many students at this school attend part time while also doing an apprenticeship.
 - *Berufsfachschule*—1- to 3-year full-time basic vocational school
 - *Fachoberschule*—2-year advanced vocational school
 - *Gymnasium/Gymnasiale Oberstufe*—Academic upper secondary school. *Gymnasium* continues from lower secondary school. *Gymnasiale Oberstufe* follows the same curriculum as the *Gymnasium*, but comes after *Gesamtschule*.
- Ages: 16 to 18 (graduation generally at 19 for academic programs; 18 or 19 for others)
- Number of years: 1 to 4
- Universal enrollment: Through age 17 (see indicator 2) (most students in long programs turn 19 during the last year of upper secondary school)
- Compulsory: Until age 18
- Entrance/exit criteria: Students must pass the *Abitur* in order to enter university and other forms of higher education.

NOTE: *Gymnasium* and *Gesamtschule* are generally combined lower and upper secondary schools, although students concentrate their studies on fewer subjects during the last years of *Gymnasium*. Some *Länder* offer fast tracks, where students can graduate from *Gymnasium* a year early. Additionally, a few *Länder* offer the *Berufsoberschule*, a vocational upper secondary school for those who have completed vocational training or have 5 years of work experience.

Postsecondary and tertiary:

- Common name: *Berufsakademie*, *Fachhochschule*, *Universität*
- Ages of attendance: Varies
- Number of years: Varies according to degree
- Universal enrollment: No
- Entrance criteria: Students must pass the *Abitur* in order to enter university. Students must have at a minimum a *Fachhochschulreife* (vocational upper secondary diploma) in order to enter the tertiary sector.

Common degree programs:

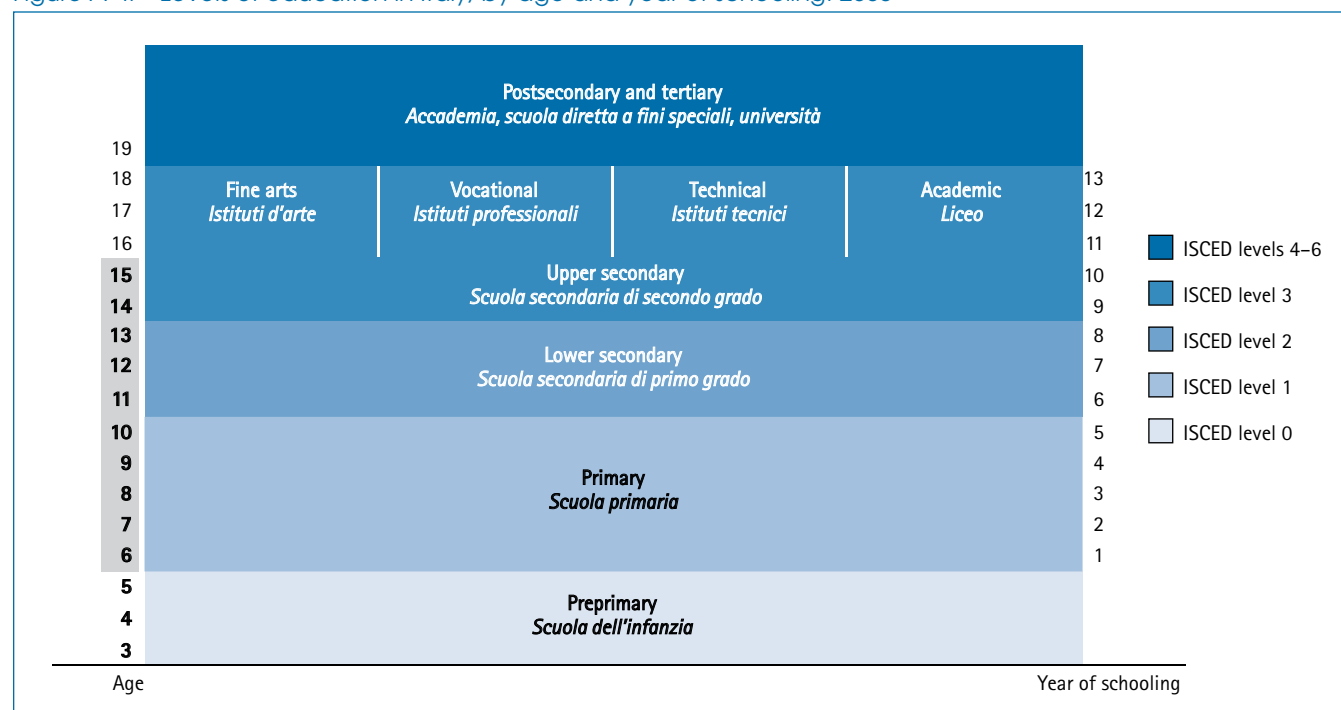
- **Diplom Fachhochschule—FH:** 4-year degree program in applied fields such as engineering, administration, social services, and design. Admission to a *Fachhochschule* is competitive due to restricted numbers of available spaces.
- **Diplom Berufsakademie—BA:** 3-year program of academic training combined with work experience. Offered at a *Berufsakademie*.
- **Diplom:** Master's degree equivalent usually requiring a minimum of 4 years of study. *Universität* offers this degree in academic fields as well as scientific, technical, and engineering fields.
- **Magister:** Usually requires 2 years beyond the *Diplom*, taken at *Universität*.
- **Doktorgrad:** Doctoral degree program, focused on research and taken at *Universität*. Normally requires at least 2 years beyond the *Magister*, but some students attend after receiving a *Diplom*.

Sources

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THE EDUCATION SYSTEM IN ITALY

Figure A-4. Levels of education in Italy, by age and year of schooling: 2006



NOTE: Ages represent the typical age at the beginning of the school year. Numbers in bold print indicate ages of universal enrollment (i.e., an enrollment rate of over 90 percent). Numbers shaded represent the age at which compulsory enrollment begins through the age at which compulsory enrollment ends. In some countries, enrollment rates may fall below universal before the ending age of compulsory education. No meaning should be inferred from width of subdivisions. Duration of first university degree program is generally 5 years in Italy.

SOURCE: Sen, A., Partelow, L., and Miller, D.C. (2005). *Comparative Indicators of Education in the United States and Other G8 Countries: 2004* (NCES 2005-021). U.S. Department of Education. Washington, DC: National Center for Education Statistics; and Eurybase. (2006). *The Information Database on Education Systems in Europe: The Education System in Italy, 2005/2006*. Brussels: Eurydice. Retrieved October 31, 2006, from <http://194.78.211.243/Eurybase/Application/frame.asp?country=IT&language=EN>.

Preprimary:

- Common name: *Scuola dell'infanzia*
- Ages of attendance: As early as age 3 to age 5
- Number of years: 1 to 3
- Start of universal enrollment: Age 3 (see indicator 2)
- Compulsory: No

Primary:

- Common name: *Scuola primaria*
- Ages of attendance: 6 to 11
- Number of years: 5
- Universal enrollment: Yes
- Compulsory: Yes

Lower secondary:

- Common name: *Scuola secondaria di primo grado*
- Ages of attendance: 11 to 14
- Number of years: 3
- Universal enrollment: Yes

- Compulsory: Yes
- Entrance/exit criteria: Yes, there is a national exit examination, which students must pass to obtain the *diploma di esame di stato conclusivo del primo ciclo di istruzione* and enter into upper secondary school.

Upper secondary:

- Common name: *Scuola secondaria di secondo grado*
 - *Istituti d'arte, liceo artistico*—Fine arts schools and institutes
 - *Istituti professionali*—Vocational schools
 - *Istituti tecnici*—Specialized technical schools
 - *Liceo classico, scientifico, linguistico, socio-psico-pedagogico*—Academic upper secondary schools
- Ages of attendance: 14 to 18 (graduation generally at age 19)
- Number of years: 5
- Universal enrollment: Through age 15 (see indicator 2)
- Compulsory: Beginning in the 2004–05 school year, upper secondary education was classified as a “right and a duty.” This terminology is used to indicate that completing upper secondary education is expected, although not required by law.

- Entrance/exit criteria: Students must possess the *diploma di esame di stato conclusivo del primo ciclo di istruzione* from lower secondary school to enter upper secondary school. At the end of 5 years of instruction, students must pass a national examination in order to obtain a *diploma di superamento dell'esame di stato*.

NOTE: Every student who has completed 5 years of upper secondary school and has obtained a *diploma di superamento dell'esame di stato* may attend university and other forms of higher education. Students are tracked in academic as well as technical and vocational schools in Italy. Students in Italy may attend specialized art schools, such as *istituti d'arte* and *liceo artistico* at the upper secondary level. Students attending vocational schools may attend 3- or 5-year training or apprenticeship programs in applied fields, after which they often enter the labor force. *Liceo linguistico* focuses on modern foreign languages and cultures. The *liceo classico* and *scientifico* prepare students for university studies. *Liceo classico* focuses on literature, philosophy, and Latin and Greek languages. *Liceo scientifico* focuses on mathematics and science. *Liceo socio-psico-pedagogico* has a sociological, psychological, and pedagogical orientation.

Postsecondary and tertiary:

- Common name: *Accademia, scuola diretta a fini speciali, università*
 - *Alta formazione artistica e musicale*—Arts and music
 - *Scuole superiori per la mediazione linguistica*—Language mediation
 - *Istruzione e formazione tecnica superiore*—Technical education and training
 - *Laurea, laurea specialistica, dottorato di ricerca, diploma di specializzazione*—Academic higher education, university
- Ages of attendance: Varies
- Number of years: Varies according to degree program
- Universal enrollment: No
- Entrance criteria: In order to enter university, students must possess a *diploma di superamento dell'esame di stato*, a secondary school diploma obtained after passing a national exam. Some students may also enter university with a regional certificate, which is issued on the basis of professional experience in a vocational field.

NOTE: The higher education system in Italy underwent a reform process in order to make it more compatible with the higher education systems of other European countries. Universities are now based on two main cycles (the 3-year foundation degree, or *laurea*, followed by a 2 year specialist degree, or *laurea specialistica/magis-*

trale), with third-cycle degree options (*dottorato di ricerca, diploma di specializzazione*) that are similar to a doctorate in the United States. These changes were made to increase educational exchange between Italy and other European Union countries.

Common degree programs:

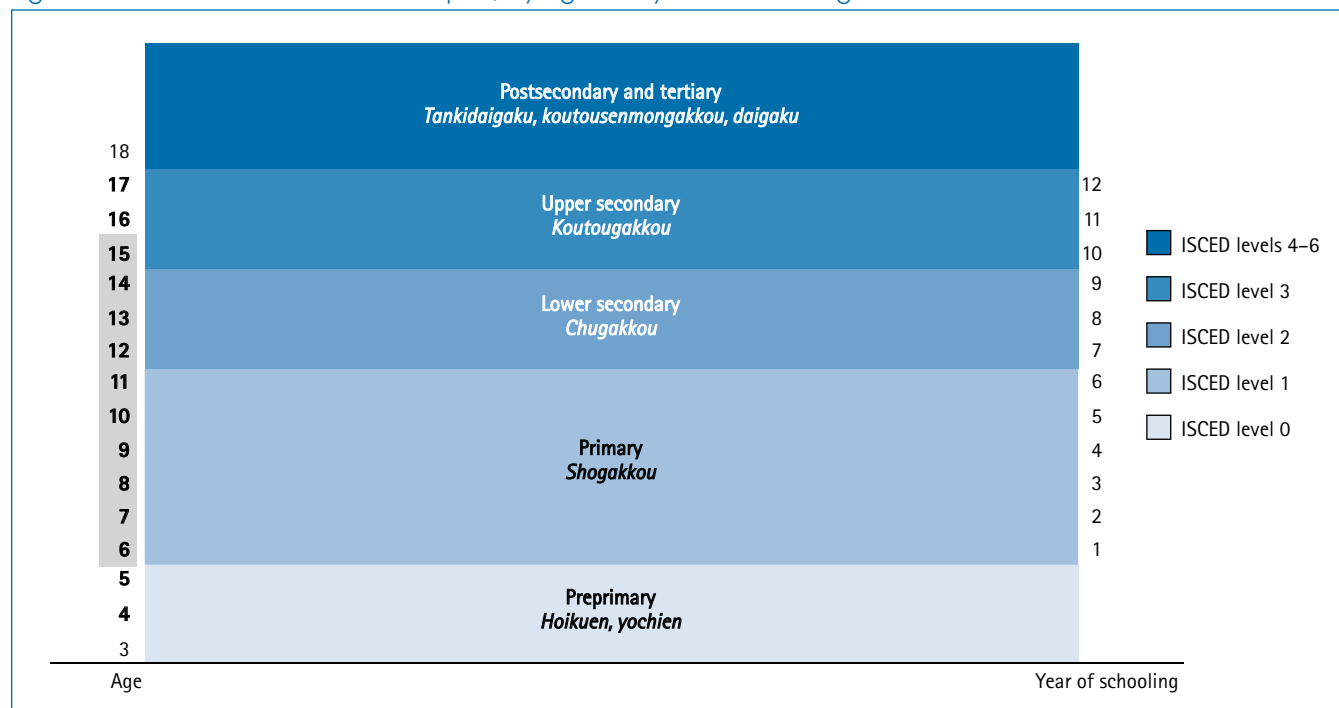
- **Accademia degrees:** Fine arts, restoration, and music degrees. *Accademia* degrees have been divided into two cycles according to the recent reforms, the first one taking 3 years to complete and the second one taking 2 years to complete. The *diploma accademico di primo livello* is awarded after the first cycle, and the *diploma accademico di secondo livello* is awarded after the second cycle.
- **Laurea:** A first-level university degree taking 3 years from university entry to complete. It is characterized by both theoretical and applied studies, similar to a bachelor's degree in the United States.
- **Laurea specialistica/magistrale:** Graduate specialized degree requiring 2 years of university study after a first-level degree, similar to a master's degree in the United States.
- **Master universitario di primo livello:** A professional graduate program requiring at least 1 year of study after obtaining a *laurea*.
- **Master universitario di secondo livello:** A professional graduate program requiring at least 1 year of study after obtaining a *laurea specialistica/magistrale*.
- **Dottorato di ricerca:** Doctoral degree program focusing on research and taken at a university. Typically requires 3 years of instruction after the *laurea specialistica/magistrale*.
- **Diploma di specializzazione:** Doctoral degree program for a specialized professional degree, such as medicine or law. Typically requires 2–6 years after the *laurea specialistica/magistrale*.

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THE EDUCATION SYSTEM IN JAPAN

Figure A-5. Levels of education in Japan, by age and year of schooling: 2006



NOTE: Ages represent the typical age at the beginning of the school year. Numbers in bold print indicate ages of universal enrollment (i.e., an enrollment rate of over 90 percent). Numbers shaded represent the age at which compulsory enrollment begins through the age at which compulsory enrollment ends. In some countries, enrollment rates may fall below universal before the ending age of compulsory education. No meaning should be inferred from width of subdivisions. Duration of first university degree program is generally 4 years in Japan.

SOURCE: Sen, A., Partelow, L., and Miller, D.C. (2005). *Comparative Indicators of Education in the United States and Other G8 Countries: 2004* (NCES 2005-021). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

Preprimary:

- Common name: *Hoikuen, yochien*
- Ages of attendance: As early as age 3 to age 5
- Number of years: 1 to 3
- Start of universal enrollment: Age 4 (see indicator 2)
- Compulsory: No

NOTE: Around 60 percent of 5-year-old students attend *yochien* (kindergarten), while others attend *hoikuen* (child care centers).

Primary:

- Common name: *Shogakkou*
- Ages of attendance: 6 to 11
- Number of years: 6
- Universal enrollment: Yes
- Compulsory: Yes

Lower secondary:

- Common name: *Chugakkou*
- Ages of attendance: 12 to 14
- Number of years: 3
- Universal enrollment: Yes

- Compulsory: Yes
- Entrance/exit criteria: No

NOTE: Recently, unified lower and upper secondary schools (*chutoukyougakkou*) have been introduced in Japan.

Upper secondary:

- Common name: *Koutougakkou*
- Ages of attendance: 15 to 17 (graduation generally at age 18)
- Number of years: 3
- Universal enrollment: Through age 17 (see indicator 2)
- Compulsory: No
- Entrance/exit criteria: Yes, students in Japan are placed into upper secondary schools based on test scores and school report cards from lower secondary school. Scoring well influences students' chances of attending the most prestigious upper secondary schools in their area.

NOTE: *Juku* refers to "cram school" or night school, which prepares students for upper secondary school entrance exams. Students may also choose to attend vocational/technical institutes (*koutousenmongakkou*), which combine upper secondary school with vocational higher education leading to the associate's degree. See below for details on *koutousenmongakkou*.

Postsecondary and tertiary:

- Common name: *Tankidaigaku*, *koutousenmongakkou*, *daigaku*
- Ages of attendance: Varies
- Number of years: 2 (*tankidaigaku*), 3 (*koutousenmongakkou*), 4 (*daigaku*, excluding medical and dental degrees), 6 (*daigaku*, medical and dental degrees)
- Universal enrollment: No
- Entrance criteria: To enter national universities, most of the students take an entrance examination offered by the National Center for University Entrance Examinations and an examination conducted by the university itself. For some universities, entrance examinations are very competitive, while others are not so competitive.

Common degree programs:

- **Jun-gakushi (at vocational and technical institutes):** 5-year programs for students to combine upper secondary school with vocational training. The first 3 years of these programs are spent at the upper secondary level and the last 2 earning a *jun-gakushi* (associate's degree). These programs are given at *koutousenmongakkou*, in subjects like public works, mechanical engineering, and information technology.
- **Jun-gakushi (at junior college):** Programs normally requiring 2 years of study, taken at junior colleges (*tankidaigaku*), that prepare students for a career in fields like home economics, humanities, education, and social science. Junior colleges have traditionally enrolled mostly women.
- **Gakushi:** Academic degree normally requiring 4 years of study that is similar to a bachelor's degree. Given at a *daigaku* (college or university). Preprofessional programs in medicine, dentistry, and veterinary medicine take 6 years.

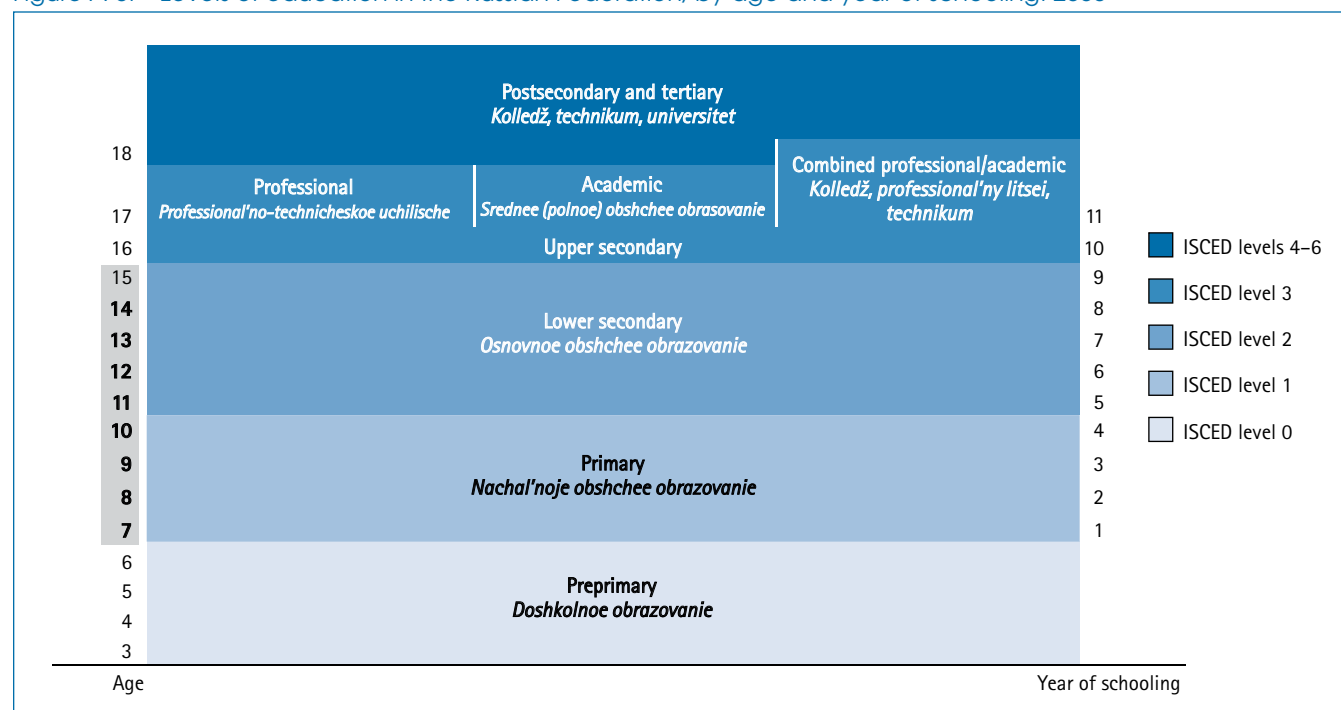
- **Shushi:** Graduate program taken at a *daigaku* that normally requires 2 years of study beyond the bachelor's degree. Equivalent to a master's degree in the United States.
- **Professional degree programs:** Medical, dental, and veterinary graduate programs taken at *daigaku* that last 4 years beyond the bachelor's degree.
- **Hakushi:** Academic graduate program at a *daigaku* requiring at least 5 years beyond the bachelor's degree. This degree is the equivalent of a doctorate in the United States.

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THE EDUCATION SYSTEM IN THE RUSSIAN FEDERATION

Figure A-6. Levels of education in the Russian Federation, by age and year of schooling: 2006



NOTE: Ages represent the typical age at the beginning of the school year. Numbers in bold print indicate ages of universal enrollment (i.e., an enrollment rate of over 90 percent). Numbers shaded represent the age at which compulsory enrollment begins through the age at which compulsory enrollment ends. In some countries, enrollment rates may fall below universal before the ending age of compulsory education. No meaning should be inferred from width of subdivisions. Duration of first university degree program is generally 4 years in the Russian Federation. SOURCE: Sen, A., Partelow, L., and Miller, D.C. (2005). *Comparative Indicators of Education in the United States and Other G8 Countries: 2004* (NCES 2005-021). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

Preprimary:

- Common name: *Doshkolnoe obrazovanie*
- Ages of attendance: As early as age 3 to age 6
- Number of years: 1 to 4
- Start of universal enrollment: Does not begin in preprimary; see below
- Compulsory: No

Primary:

- Common name: *Nachal'noye obshchee obrazovanie*
- Ages of attendance: 7 to 10
- Number of years: 4
- Start of universal enrollment: Age 7 (see indicator 2)
- Compulsory: Yes

NOTE: There are no formal divisions between primary, lower secondary, and upper secondary schools in the Russian Federation. Primary, lower secondary, and upper secondary schools are generally located in the same buildings except in rural areas.

Lower secondary:

- Common name: *Osnovnoe obshchee obrazovanie* (Basic school)
- Ages of attendance: 11 to 15
- Number of years: 5
- Universal enrollment: Yes, through age 14 (see indicator 2) (most students turn 16 during the last year of lower secondary school)
- Compulsory: Yes, until age 15
- Entrance/exit criteria: Yes, in order to graduate from basic school, students must pass four written examinations: one in Russian language, one in algebra, and two in other subjects chosen by the student.

NOTE: Basic general education includes primary and lower secondary school. Graduates of lower secondary school may either continue their education at upper secondary school to receive secondary complete general education, go to vocational schools to receive professional training, or go to secondary vocational schools to receive a combination of academic and vocational education.

Upper secondary:

- Common name: *Professional'no-technicheskoe uchilische; kolledž, professional'ny litsei, or tehnikum; srednee (polnoe) obshchee obrasovanie*
- Ages of attendance: 16 to 17 (graduation generally at age 18)
- Number of years: 2
- Universal enrollment: No
- Compulsory: No
- Entrance/exit criteria: Students in the Russian Federation must pass five written exams at the end of secondary school in order to obtain the Certificate of Secondary Complete General Education. These exams include Algebra and Calculus, Literature, and three other subjects chosen by the student.

NOTE: Students who have graduated from lower secondary school have the option to continue in three types of upper secondary schools:

- *Professional'no-technicheskoe uchilische*: These schools provide professional education only in a program that usually lasts 2 years.
- *Srednee (polnoe) obshchee obrasovanie*: Students who wish to continue their academic training enter these upper secondary schools, which last for 2 years and provide students with a Certificate of Secondary Complete General Education. This certificate qualifies students to apply for entrance into higher education. Graduates may also continue their study in initial and secondary vocational schools.
- *Kolledž, professional'ny litsei, or tehnikum*: These schools provide combined professional and academic programs that lead to a diploma (Certificate of Secondary Complete General Education). The programs are usually 3 or 4 years.

Postsecondary and tertiary:

- Common name: *Kolledž, tehnikum, universitet*
- Ages of attendance: Varies
- Number of years: Varies according to degree
- Universal enrollment: No
- Entrance criteria: There are entrance exams, called *vstupitel'noe ispytanie*, to be accepted into university. The number of exams and the subject varies according to the department a student wishes to attend, although all students must take an exam in Russian language.

Common degree programs:

- **Nonuniversity-level diploma**: Obtained from *kolledž* (colleges) and *tehnikum* (technical colleges). These diplomas are in applied or vocational fields and require 2 years of study after secondary school. Students may be able to enter university-level institutions after completing this degree and transfer some or all credits toward a *bakalavr*.

- **Diploma o nepolnom vysshem obrazovanii** (diploma of incomplete higher education): If students leave university after at least 2 years of study, they may ask for this diploma, which allows them to work in certain jobs that require some university experience but not a degree.
- **Bakalavr** (bachelor's degree): Program requiring 4 years of university study.
- **Magistr** (master's degree): Competitive 2-year program for students who have completed their *bakalavr's* degree. Most require a year of research and a thesis.
- **Diplom**: This specialized diploma can be obtained either by completing 1 year of study beyond the *bakalavr* or by completing 5 to 6 years of continuous study after upper secondary school.
- **Kandidat nauk**: Students who hold a *diplom* or *magistr* are eligible to apply for these programs, which typically last for 3 years and require students to carry out independent research and defend a dissertation in public. Equivalent of a doctorate in the United States.
- **Doktor nauk**: This is the highest possible academic degree in the Russian Federation, for which there is no U.S. equivalent. This degree requires that a *kandidat nauk* gain reputation in his or her field of study, publish independent research, and have experience supervising undergraduates. A 3-year sabbatical is often taken to prepare research for the degree, although there is no specified length of time required to obtain it. The *doktor nauk* requires a public dissertation defense (in addition to the defense completed to obtain a *kandidat nauk*).

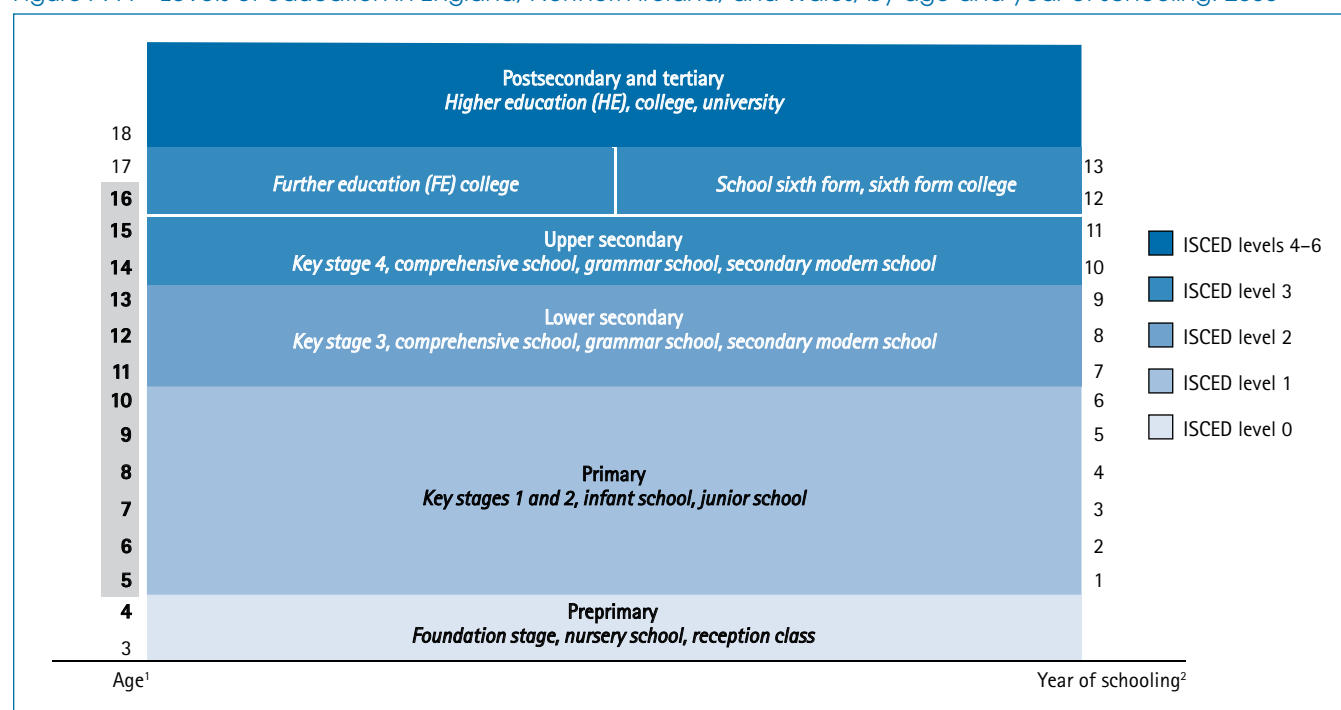
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THE EDUCATION SYSTEM IN THE UNITED KINGDOM

The Education System in England, Northern Ireland, and Wales

Figure A-7. Levels of education in England, Northern Ireland, and Wales, by age and year of schooling: 2006



¹In Northern Ireland, however, compulsory enrollment begins at age 4.

²In Northern Ireland, however, there are 14 years of schooling, with year 1 beginning at the preprimary level (age 4).

NOTE: Ages represent the typical age at the beginning of the school year. Numbers in bold print indicate ages of universal enrollment (i.e., an enrollment rate of over 90 percent). Numbers shaded represent the age at which compulsory enrollment begins through the age at which compulsory enrollment ends. In some countries, enrollment rates may fall below universal before the ending age of compulsory education. No meaning should be inferred from width of subdivisions. Duration of first university degree program is generally 3 years in England, Northern Ireland, and Wales. SOURCE: Sen, A., Partelow, L., and Miller, D.C. (2005). *Comparative Indicators of Education in the United States and Other G8 Countries: 2004* (NCES 2005-021). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

NOTE: There are differences within the education system of the United Kingdom due to responsibilities and oversight for education taking place at the regional or local level. However, the purpose of this document is to present a brief, general summary of education in the United Kingdom. Thus, some differences within the education system of the United Kingdom may not be discussed here. The sources cited at the end of this section provide more specific details about education in the United Kingdom.

Preprimary:

- Common name: *Foundation stage, nursery school, reception class*
- Ages of attendance: 3 to 4
- Number of years: 1 to 2
- Start of universal enrollment: Age 4 (see indicator 2)
- Compulsory: No

NOTE: Some students attend a "reception class" between nursery school and primary school. This is comparable to kindergarten in the United States, with academic activities, and provides a "bridge"

between nursery school and key stage 1 for students who will achieve compulsory school age later in that academic year.

Primary:

- Common name: *Key stages 1 and 2, infant school, junior school*
- Ages of attendance: 5 to 10 (England and Wales), 4 to 10 (Northern Ireland)
- Number of years: 6 (England and Wales), 7 (Northern Ireland)
- Universal enrollment: Yes
- Compulsory: Yes

NOTE: The primary school years are divided into two stages. The first stage (key stage 1), which may be preceded by the reception class, is sometimes called infant school. It consists of the first 2 years (in England and Wales) or 3 years (in Northern Ireland) of primary school. The second stage (key stage 2) is often called junior school and encompasses the next 4 years of primary school.

Lower secondary:

- Common name: *Key stage 3, comprehensive school, grammar school, secondary modern school*

- Ages of attendance: 11 to 13
- Number of years: 3
- Universal enrollment: Yes
- Compulsory: Yes
- Entrance/exit criteria: No (except for grammar schools, which set entrance criteria)

NOTE: Although lower and upper secondary school are typically combined in the United Kingdom, the first 3 years of secondary school are classified as lower secondary under the ISCED and are commonly referred to as key stage 3. Some areas have grammar schools and secondary modern schools, which enroll children with higher and lower achievement, respectively.

Upper secondary:

- Common name: *Key stage 4, comprehensive school, grammar school, secondary modern school, school sixth form, sixth form college, further education college*
- Ages of attendance: 14 to 17 (graduation generally at age 18)
- Number of years: 4
- Universal enrollment: Through age 16 (see indicator 2)
- Compulsory: Until age 16
- Entrance/exit criteria: In order to obtain the General Certificate of Secondary Education (GCSE), students take a series of single-subject examinations after the first 2 years of upper secondary school (at age 15/16). The General Certificate of Education (GCE) Advanced levels (A levels) and the GCE Advanced Subsidiary examinations (AS levels) are similar tests taken in the sixth form (described below).

NOTE: Comprehensive schools, grammar schools, and secondary modern schools all lead to the General Certificate of Secondary Education (GCSE), typically at age 16. After the first 2 years of upper secondary school, and after receiving the GCSE, students have the option of continuing school for 2 years, often called the sixth form. Some schools do not offer the sixth form, in which case students can transfer to a sixth form college (which is similar but in a separate school) or go to a further education college. Sixth forms usually offer the General Certificate of Education Advanced Subsidiary qualification (GCE AS level) at age 17 and the General Certificate of Education Advanced level examination (GCE A level) at age 18. GCE A levels are usually required for entry to higher education. Increasingly, however, students are able to enter higher education with a parallel qualification such as the Vocational Certificate of Education (VCE). These vocational certificates are also known as A levels in applied subjects. If students choose not to enter sixth form, their options are the labor force (often through apprenticeships or youth training courses) or a further education sector college. Further education sector colleges have traditionally offered vocational courses, but increasingly have academic programs.

Postsecondary and tertiary:

- Common name: *Higher education (HE), college, university*
- Ages of attendance: Varies
- Number of years: Varies according to degree

- Universal enrollment: No
- Entrance criteria: GCE Advanced levels (A level) or equivalent, such as the Vocational Certificate of Education or A level in applied subjects, are required for admittance into the tertiary sector.

Common degree programs:

- **Certificates of higher education:** 1-year vocational courses.
- **Diploma:** Short undergraduate programs, which vary in length, offered at colleges and universities.
- **Foundation degree:** Employment-related higher education qualification taking 2 years to complete and offered at colleges and universities.
- **Bachelor's degree:** 3- to 4-year academic programs at colleges or universities. Most students opt for an honors degree, the requirements of which are specific to schools and departments. Honors degrees are an entrance requirement for most graduate programs.
- **Advanced short degree:** Short degree programs, which vary in length, for students who have already acquired a bachelor's degree, for example, the postgraduate certificate of education. Courses offered are often professional development-oriented.
- **Master's degree:** Usually a taught (as opposed to research) postgraduate degree offered at colleges and universities. One year or more beyond an honors bachelor's degree.
- **Professional degrees:** Advanced degrees in professional fields such as engineering, accounting, medicine, and information science. Number of years required to complete varies.
- **Doctorate:** Research-oriented postgraduate degree. Minimum of 3 years in duration.

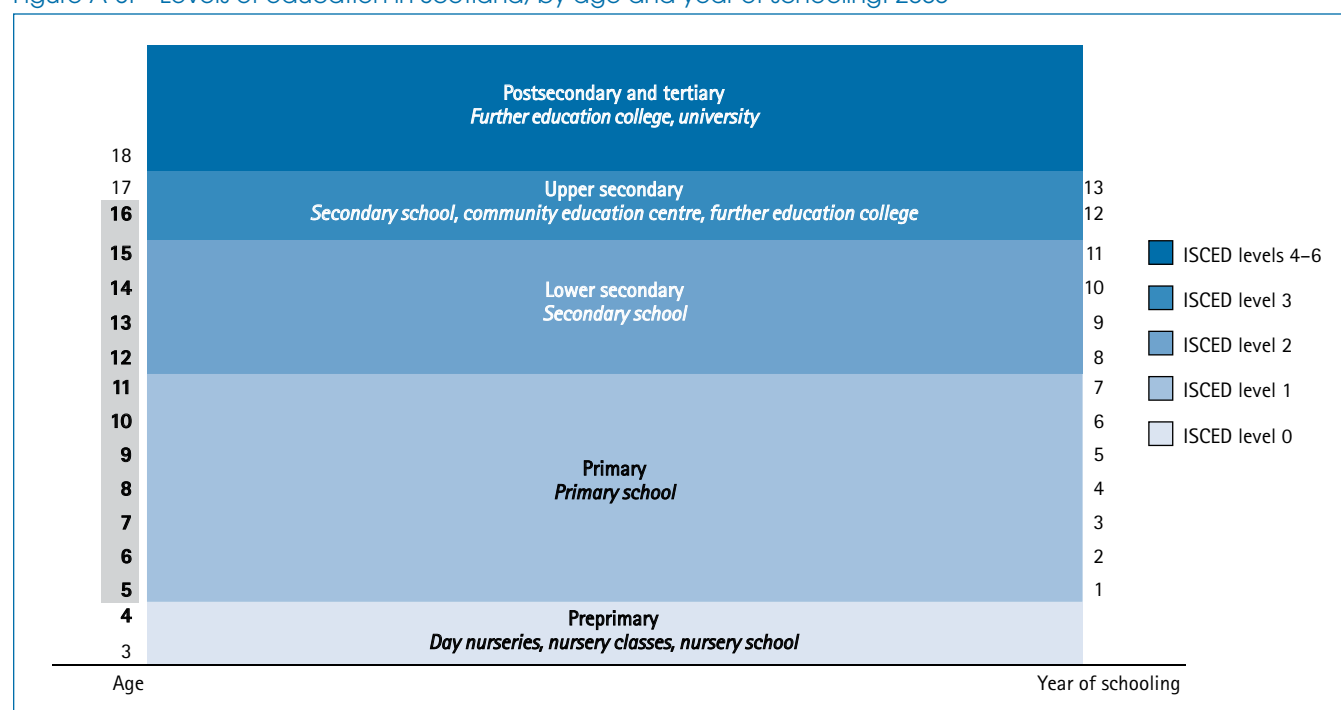
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THE EDUCATION SYSTEM IN THE UNITED KINGDOM

The Education System in Scotland

Figure A-8. Levels of education in Scotland, by age and year of schooling: 2006



NOTE: Ages represent the typical age at the beginning of the school year. Numbers in bold print indicate ages of universal enrollment (i.e., an enrollment rate of over 90 percent). Numbers shaded represent the age at which compulsory enrollment begins through the age at which compulsory enrollment ends. In some countries, enrollment rates may fall below universal before the ending age of compulsory education. No meaning should be inferred from width of subdivisions. Duration of first university degree program is generally 3 or 4 years in Scotland.
SOURCE: Sen, A., Partelow, L., and Miller, D.C. (2005). *Comparative Indicators of Education in the United States and Other G8 Countries: 2004* (NCES 2005-021). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

NOTE: The education system in Scotland is different from that which exists in the rest of the United Kingdom. Responsibility for education is held by the Scottish Parliament and the Scottish Executive Education Department (SEED).

Preprimary:

- Common name: *Day nurseries, nursery classes, nursery school*
- Ages of attendance: As early as age 3 to age 4
- Number of years: 1 to 2
- Start of universal enrollment: Age 4
- Compulsory: No

Primary:

- Common name: *Primary school*
- Ages of attendance: 5 to 11
- Number of years: 7
- Universal enrollment: Yes
- Compulsory: Yes

Lower secondary:

- Common name: *Secondary school*
- Ages of attendance: 12 to 15
- Number of years: 4
- Universal enrollment: Through age 16 (see indicator 2) (most students turn 16 during the last year of lower secondary school)
- Compulsory: Yes, until age 16
- Entrance/exit criteria: No restrictions on entrance. At the end of lower secondary education, students generally take the examinations for the Scottish Qualifications Certificate (SQC) at Standard Grade or National Qualifications courses/units. These examinations are intended to be taken by the whole school population.

Upper secondary:

- Common name: *Secondary school, community education centre, further education college*
- Ages of attendance: 16 to 17 (graduation generally at age 18)
- Number of years: 2
- Universal enrollment: Through age 16

- Compulsory: No
- Entrance/exit criteria: A unified system of National Qualifications exams has been introduced for students in secondary schools, further education colleges, and training centers. Students who plan to go into higher education take the higher level examinations of the SQC.

NOTE: During upper secondary school, students in Scotland have the option to continue in a traditional secondary school or to attend further education colleges. There are also nationally funded training and apprenticeship programs in which students can participate if they choose not to attend upper secondary school.

Postsecondary and tertiary:

- Common name: *Further education college, university*
- Ages of attendance: Varies
- Number of years: Varies according to course/degree
- Universal enrollment: No
- Entrance criteria: The usual entry requirements for university are the higher or advanced higher level examinations of the SQC (see above). Further education colleges admit students who have just left school at age 16, students who have left school at age 17 or 18 with and without formal certification, and are now admitting an increasing number of older students. Admission requirements at further education colleges are decided by the institution.

Common degree programs:

- Further education colleges provide mainly vocational education courses at the secondary level, but also have some higher education programs.
- **Bachelor's degree:** Courses leading to an ordinary bachelor's degree last 3 years, while courses leading to a degree with honors are typically 4 years. There are also some courses where the first award is a master's degree.
- **Master's degree:** Taught master's degrees are typically 1-year

programs, but research master's degrees are generally longer. Entrance into a master's program generally requires a bachelor's degree.

- **Professional degree programs:** Programs leading to professional registration as a doctor, dentist, etc. Typically require 5 years beyond the bachelor's degree.
- **Doctorate:** A doctorate generally requires 3 years of full-time study or 4 to 6 years if part time.

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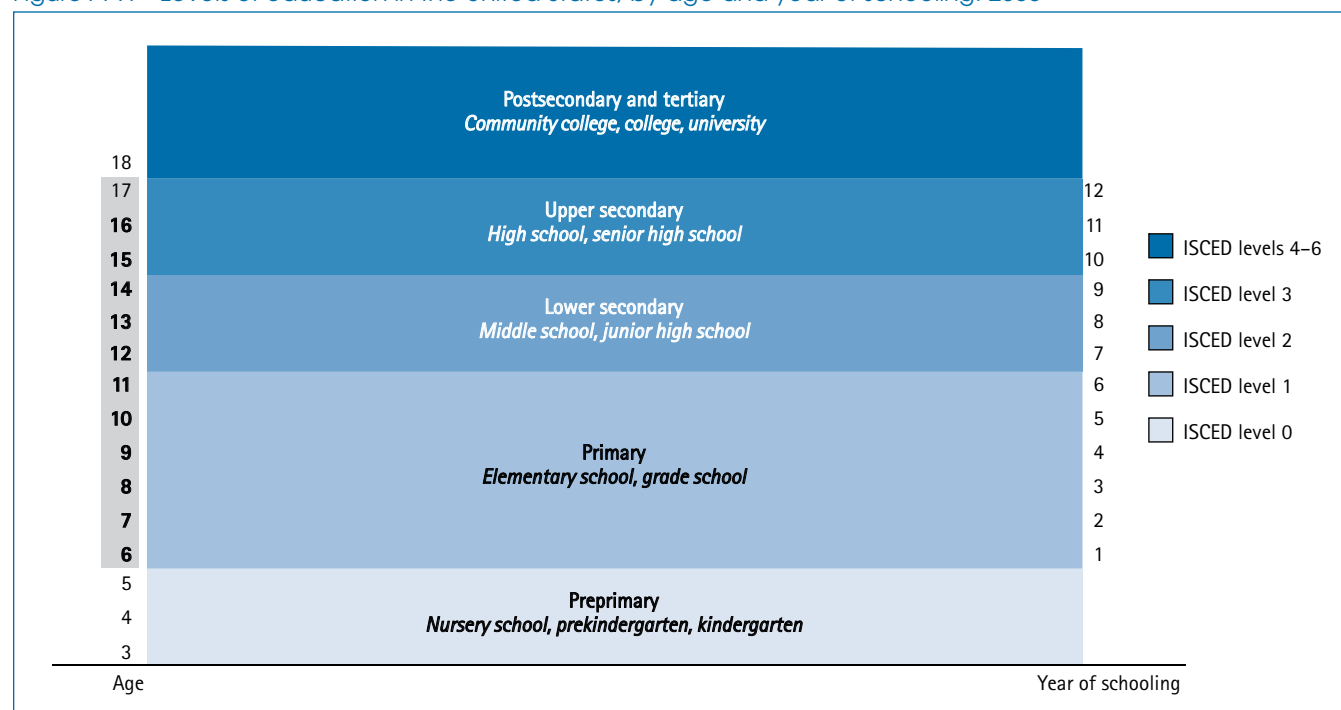
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THE EDUCATION SYSTEM IN THE UNITED STATES

Figure A-9. Levels of education in the United States, by age and year of schooling: 2006



NOTE: Ages represent the typical age at the beginning of the school year. Numbers in bold print indicate ages of universal enrollment (i.e., an enrollment rate of over 90 percent). Numbers shaded represent the age at which compulsory enrollment begins through the age at which compulsory enrollment ends. In some countries, enrollment rates may fall below universal before the ending age of compulsory education. No meaning should be inferred from width of subdivisions. Duration of first university degree program is generally 4 years in the United States. SOURCE: Sen, A., Partelow, L., and Miller, D.C. (2005). *Comparative Indicators of Education in the United States and Other G8 Countries: 2004* (NCES 2005-021). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

NOTE: There are differences within the education system of the United States due to responsibilities and oversight for education taking place at the regional or local level. However, the purpose of this document is to present a brief, general summary of education in the United States. Thus, some differences within the education system of the United States may not be discussed here. The sources cited at the end of this section provide more specific details about education in the United States.

Preprimary:

- Common name: *Nursery school, prekindergarten, kindergarten*
- Ages of attendance: As early as age 3 to age 5
- Number of years: 1 to 3
- Start of universal enrollment: Does not begin in preprimary; see below
- Compulsory: Generally no, but yes in some states

Primary:

- Common name: *Elementary school, grade school*
- Ages of attendance: 6 to 11
- Number of years: 6

- Start of universal enrollment: Age 6 (see indicator 2)
- Compulsory: Yes

NOTE: Based on the ISCED, the first 6 years of schooling are classified as primary in the United States. Students may attend 5- or 6-year elementary schools. Some students also attend elementary schools that include eight grades.

Lower secondary:

- Common name: *Middle school, junior high school*
- Ages of attendance: 12 to 14
- Number of years: 3
- Universal enrollment: Yes
- Compulsory: Yes
- Entrance/exit criteria: No

NOTE: Based on the ISCED, the 3 years of schooling following primary school are classified as lower secondary in the United States. Students may attend 2- or 3-year junior high schools or middle schools. Some students also attend combined junior-senior high schools.

Upper secondary:

- Common name: *High school, senior high school*
- Ages of attendance: 15 to 17 (graduation generally in the year of the student's 18th birthday, though this can vary depending on a student's birth date and the state's kindergarten cut-off date)
- Number of years: 3
- Universal enrollment: Through age 16 (see indicator 2) (most students turn 18 during the last year of upper secondary school)
- Compulsory: The average ending age of compulsory education in the United States is 17 (see indicator 2). This age varies across states, ranging from 16 to 18; the modal age is 16
- Entrance/exit criteria: There are not generally entrance exams, although some states have begun instituting exit examinations that are required to receive a diploma. College-bound students usually take the Scholastic Aptitude Test (SAT) or ACT Assessment (ACT), privately administered standardized tests that partly determine college admittance. Admittance is also affected by previous grades, coursework, and other factors such as teacher recommendations and extracurricular participation.

NOTE: Based on the ISCED, the last 3 years of schooling prior to receiving a high school diploma are classified as upper secondary in the United States. Senior high schools may be 3 or 4 years in length. Some students attend combined junior-senior high schools.

Postsecondary and tertiary:

- Common name: *Community college, college, university*
- Ages of attendance: Varies
- Number of years: Varies according to degree
- Universal enrollment: No
- Entrance criteria: Varies according to degree. Students in the United States usually take the SAT or ACT (see above) as part of the entrance requirements for higher education. Most colleges and universities set their own admissions standards, so the requirements vary substantially from institution to institution.

Common degree programs:

- **Certificate programs:** Vocational programs of 6 months to 1 year offered in public community colleges and private for-profit trade schools.
- **Associate's degrees:** 2-year programs offered in fields of study that prepare students for the labor force or entry into a 4-year

college or university. Granted at vocational and technical institutes as well as community colleges.

- **Bachelor's degrees:** 4-year academic programs at a college or university that prepare students for the labor force or graduate study.
- **Master's degrees:** Graduate program at a university that requires 2 years of study beyond the bachelor's degree and leads to a master's degree.
- **Professional degrees:** Graduate programs such as medicine or law taken at a university medical or law school. Typically require 3 or more years beyond the bachelor's degree and result in specialized degrees such as the Medical Doctorate (M.D.) or Juris Doctor (J.D.).
- **Doctorate:** Academic graduate program at a university typically requiring a minimum of 3 or 4 years of study and research beyond the bachelor's degree.

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